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JOURNAL *of* EDUCATIONAL RESEARCH

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VARIOUS METHODS OF MASTERING NEW WORDS WHILE LEARNING TO READ

WILLIAM F. BOOK
Indiana University

1. GENERAL IMPORTANCE OF THE PROBLEM

THE chief aim of all reading is to stimulate thinking and to obtain new information. This means that the reader is continually meeting new words and combinations of words which represent or suggest new ideas or facts. The learner must, therefore, not only be able to recognize and interpret printed words which are already familiar to him, but must also be able to recognize and correctly interpret all *new* words which he encounters in the ever-changing combinations of words found in printed materials.

Broadly speaking, the early stages of learning to read may be characterized as a time when correct meanings are attached to the printed words. In the later stages, the pupil is deriving meaning from the printed page. It is, therefore, difficult for a pupil just beginning to read to derive new meanings from printed words or even to get recombinations of ideas through the use of words. His problem is to attach meanings to these words.

The reading materials for the early grades should, therefore, represent ideas and experiences that are familiar to the pupils. The words and phrases used to express ideas must be such that the learners will be able to attach vivid personal experiences to them quickly and easily. If words are used for which the child has had no vivid personal experience, they cannot be interpreted, and he will be content merely to pronounce these words instead of linking the proper meaning to them.

After a child has learned to recognize and to interpret a number of words that will make him recall promptly and accurately certain experiences and ideas, the learning process begins to be reversed. The child now begins to interpret what he reads. He begins to get new ideas from the printed page. For example, when he has learned the meaning

of such words as "hot," "winter," "summer," "always," etc., he may read about a place where it is always hot and where winter never comes. This carries him into a world of meaning that can only be understood through the proper connection of words with his everyday experiences.

This process of *interpreting* the printed page cannot, however, begin or be successfully carried on until the learner acquires the ability to master new words. And the most effective methods of mastering new words cannot begin to function until a certain number of words have already been learned in the way described in Section Two following. In fact, during the first three grades in school the child reads mainly to learn to recognize and interpret words. After this he should read to get new experiences and thoughts.

One of the pupil's problems in learning to read is, therefore, to acquire the ability to interpret all the new words which he meets in the course of his reading and to fix these permanently in his mind both in form and meaning, in such a way that they can be recognized and interpreted without presenting any special problems to him as he reads. How may this be done?

Most of the time and effort, in all methods of teaching beginners to read, has been given to the solution of this problem, but very often teachers and investigators have not had a clear idea of just what the learners must do to reach the goal desired. It is too often forgotten that the problems encountered in mastering the mechanics of the reading process should be solved in such a way that their solution will *aid* rather than *retard* the learner in the more advanced stages of the reading process.

With these thoughts in mind, we may now inquire how spoken and written words come to get their meanings, and how printed language symbols are learned, and then describe the various methods that have been used to assist pupils in mastering the new words which they regularly encounter in their reading exercises.

2. HOW SPOKEN AND PRINTED WORDS COME TO GET MEANING

Much mystery has been attached to the problem of how language symbols come to get their significance or arouse in the reader the proper meaning responses. This problem can be readily explained if one keeps in mind what actually happens as a child learns to recognize these language symbols and acquires the ability to understand them. All printed or spoken words represent a meaningless picture or sound to the child

until they come to represent certain habitual reactions previously made by him to certain parts of his environment. We shall, therefore, next consider how spoken and printed words acquire the power to arouse these appropriate meaning responses.

(1) How a Child Learns to Understand and Use Oral Speech.—We may begin by examining the process a child goes through to learn the correct meaning for such an object as a box. This object serves, of course, as a successful stimulus, causing the child to open and close it many times, to put things into it, and to take things out of it again. The mother, noticing that the child is reacting to the box in every way that it can, begins to say "box" when the child is handed the box. This is followed by the words "open box" when the child is trying to open it. The mother also says "close box" when the child closes it; or speaks the words "put dolly in box" when this act is performed. These stimuli are given together in this way many times; and the child learns by the principle of "conditioning" and the law of combination[1] that the spoken word represents this object and all his experiences with it.

Finally the child begins to talk, and the object "box," which originally called forth only the bodily and sensory habits used in handling it, calls forth the spoken word "box" when this object is seen, and the words "open box" when the child opens it. In other words, the visible box has now become a stimulus that is capable of releasing two different kinds of reactions in the child: (1) the series of reactions used in his manipulations of the box; (2) a vocal response which has come to represent most or all of the actual experiences which the child has had with this object. The child can now make at will either one or both of these responses to this object. Which of these responses he will make at any particular time depends upon his needs at the moment and upon many other factors which help determine his behavior at any particular moment. It is here that his meaning for the *spoken* word begins to develop and function in his life.

To really learn the meaning of the spoken word, further stimulation and more varied experiences with the box are needed. These experiences are provided in the course of the child's normal reactions to this object. He has, however, not yet learned the true meaning of the spoken

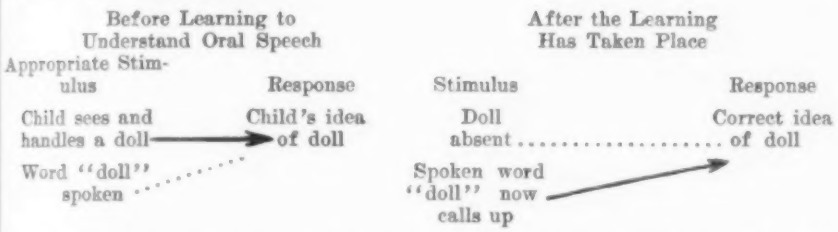
[1] The law that where stimuli are regularly presented together, the response made at first only to the appropriate stimulus soon comes to be made to the other inappropriate one also, which may now be substituted for the appropriate one in arousing the desired response.

word "box" or its full significance. The experiences needed to give him a correct idea of the meaning of the *spoken* word are provided in the following way:

One day the child sees and recognizes his old friend, the box, sitting on the table. He runs to it and tries to reach it as he pronounces its name. The child's mother, seeing his efforts to reach it, and hearing him speak the word "box," hands it to the child. This new experience with the box and similar experiences are repeated day after day, not only with the box, but with scores of other objects as well. The child, therefore, eventually learns oral speech and to speak the word "box" without executing the movements of actually going to the box, and comes to use the word "box" in this representative way to get what he wants. That is to say, he learns through his bodily reactions *to* and experiences *with* this object what the *spoken word* "box" really means. When this learning process has been completed, and language habits corresponding to all his experiences have been acquired, the act of speaking these words may be substituted for the former bodily habits. The sound of the spoken word recalls most of these experiences because, by the process of learning to be explained in the following section, the spoken word acts as a substitute stimulus for recalling all or most of the experiences which the child has had with the box.

(2) How the Spoken Word Comes to Represent Certain Meanings to the Child.—The child, therefore, gets his first meaning responses from being stimulated by objects and occurrences in his immediate environment and by making certain instinctive and learned reactions to these stimulating situations as has just been explained. Long and continued experimentation with everything in its environment, covering a score or more of months, gives the child a rich fund of meaningful experiences acquired through his reactions to his physical and social environment. Then he begins to understand the spoken words which have been definitely associated with these experiences so that they have come to represent certain specific parts of these personal experiences. For example, as the child learns to walk, his mother and nurse regularly utter the word "fall" when the child becomes unsteady and drops to the floor. After enough repetitions of this double set of stimuli, the child eventually learns what the spoken word "fall" really means, because some sort of a functional linkage between the spoken word and the correct meaning response has become strongly enough established by the practice to enable this inappropriate stimulus (the spoken word) to

call up the same meaning reaction that was formerly aroused only by the experience of falling itself. In this way the child learns to associate proper meaning responses with every spoken word, including words which express relations and such abstract and accumulative experiences as are represented by "up," "down," "bad," etc. He even acquires the ability to get new experiences through the avenue of oral speech. The general nature of the learning process involved may be pictured by the following diagram:



As the diagram shows, with practice the spoken word comes to act as a successful stimulus for arousing the correct meaning response and may be substituted for the child's actual experiences with the doll. After the learning, the spoken word "doll" will arouse, more or less completely, all the experiences that the child has had with the doll.

This is the simplest type of learning that takes place and explains why a child could learn French, German, Russian, or Japanese as readily as English if either of these languages were consistently spoken in his presence while he was accumulating his personal experiences with the world.

In this type of learning, there is very little difficulty in getting the first correct response or in attaching it to the new substitute stimulus. The *fixing* of these oral language habits is, however, a difficult process, because the pronunciation of the words must be heard and associated with the appropriate experience for a very long time to make the recognition and proper interpretation of the spoken words easy and certain.

The next step in this language learning process is still more important, for not only is the meaning of individual words built up in this way, but the higher language habits also are acquired in a similar manner, so that the child long before he begins to learn to read has enough of these oral language habits to use *spoken words* as a successful stimulus for learning the meaning of *printed words* when arranged in correct language form.

How the child gets the correct meaning for a series of words when arranged to form a larger language unit than a word, such as a phrase or sentence, may be illustrated by the child's further experience with the box. He has often gone to the box with his arms full of toys, because he has been trained to keep certain things in this box. He has, therefore, frequently heard the command "put dolly in the box." When his arms are full of toys and the box is not in sight, he may, therefore, call for the box since he has learned by the principle of conditioning both to understand and to speak this particular series of words when he wants the box for his toys.

In this manner the child learns the meaning of words arranged in proper language form so well that he can make known to his elders and associates his personal wants and desires by means of oral language. And his needs and desires serve as a sufficient motive force to cause him to learn not only what these language symbols *mean* but how *to use them* correctly to get what he wants.

3. HOW PRINTED AND WRITTEN LANGUAGE SYMBOLS COME TO AROUSE THE APPROPRIATE MEANING RESPONSE

After the child has attained considerable proficiency in understanding oral speech and has learned to use it to express his own ideas and desires, the next step for most children is to learn to interpret these same language symbols when presented in printed or written form.

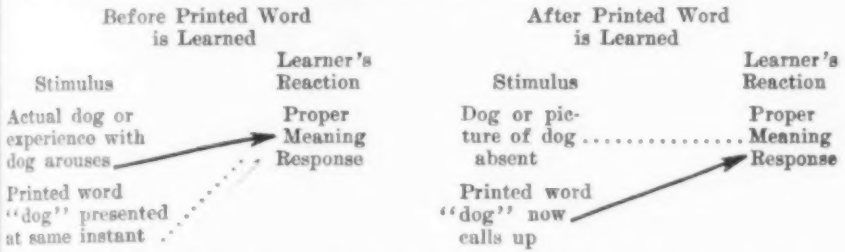
The first step in understanding how a child learns to read is, therefore, to see how a printed symbol comes to call up promptly and accurately the exact experience which it represents. Here, as in oral speech, it is much simpler and easier, both psychologically and practically, to learn to recognize and comprehend these printed and written symbols than it is to learn to *use* them to express one's own thoughts and desires either by speaking or by writing.

(1) How a Child Learns to Read by the Visual Method.—In learning to read, as in acquiring the ability to understand oral speech, the learner's first problem consists merely of substituting the written or printed word for a stimulus that already arouses the correct meaning response.

Making this substitution in stimuli consists practically in making another set of conditioned responses by associating the printed and written word with the actual experience, or something that already represents this experience, like a picture or the spoken word, and making

the appropriate meaning response to this combination of stimuli often enough to establish a definite linkage between this new and inappropriate stimulus and the appropriate meaning response. When the child has learned to read, this new stimulus (the printed word) will arouse the correct meaning response as quickly and accurately as if the experience itself were repeated.

The same law which governs this step in learning to read is operative when a student learns to understand or translate any foreign language and may be illustrated by the following diagram:


Before Printed Word is Learned
Stimulus
Learner's Reaction
Actual dog or experience with dog arouses
Proper Meaning Response
Printed word "dog" presented at same instant
After Printed Word is Learned
Stimulus
Learner's Reaction
Dog or picture of dog absent
Proper Meaning Response
Printed word "dog" now calls up

Before a child has learned the printed word "dog," an actual dog or picture of a dog is required to arouse in the mind of the child the proper meaning response.[2] With continued practice and by always associating the printed or written word with the picture or animal itself, the printed word soon begins to serve as a successful stimulus for arousing the correct meaning for that word and comes to perform this function almost as well as the actual experience itself.

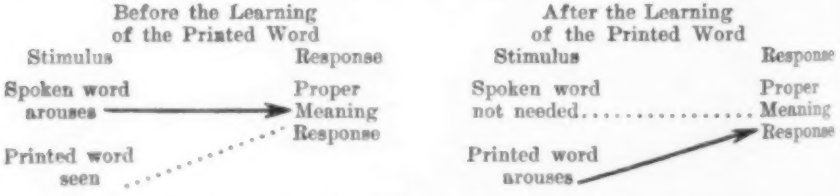
(2) How a Child Learns to Read by the Oral-Speech Method.— There are two ways to learn these printed symbols. The first is to master these symbols direct, as was indicated above. The usual method followed in the school is, however, to use *oral speech* as the effective stimulus, since every child of school age already possesses a fund of oral speech habits. Recently, however, the simpler and more direct method of *visual* reading illustrated in the preceding paragraph and diagram has come into use.[3] In oral reading, the word is pronounced or spoken by the teacher and regularly repeated by the learner at the same time that the printed or written word is presented and perceived. Since

[2] After oral speech has been learned, the spoken word may, of course, call up the proper meaning responses, as will be explained in the next paragraph.

[3] Contrast with this oral-speech method of learning to read the Courtis and Smith method of learning to read by the sight method. See Courtis and Smith Readers, World Book Co., Yonkers, N. Y.

the child has already learned the meaning of the *spoken* words and has learned how to use them in his own oral speech, the speaking of the word will, as a rule, arouse the particular meaning response which the word represents. The spoken word may, therefore, be used as a successful stimulus for arousing the appropriate *meaning* response represented by the *printed* word. This fact very soon enables the learner not only to recognize the printed word, but to associate the correct meaning of the word with its printed form. This will always be the case if the *spoken* word has aroused the true meaning response.[4] When a sufficient number of repetitions have been made of this combination of stimuli, the printed word can be correctly recognized and interpreted since it has been substituted for the sound of the word by the principle of conditioning already explained.

In the beginning stages of learning to recognize and apprehend the meaning of the printed words by the oral speech method, the words must always be pronounced and often spelled to make their recognition and proper interpretation sure. Here it is the pronunciation of the word that arouses the correct meaning response. Eventually the mere sight of the word will arouse it so that the two kinds of reading finally come to the same end. But if we start with oral reading, the habit of pronouncing the words must be eliminated when silent reading is emphasized. What actually happens when a child learns to read by this "oral-speech" method may be diagrammatically represented as follows:



(3) The Oral and Visual Method of Learning to Read Compared.— The visual method of learning to recognize and apprehend the meaning of the printed words has the advantage that the correct meaning response is much more apt to be aroused by a picture or by the experience of the learner than by the mere pronounciation of the word. Moreover, when the learner uses the visual method, he practices from

[4] It is, however, too often assumed that because a learner can recognize and pronounce a printed word he is making the proper meaning response. Usually, he is not.

the start the exact form of reaction (i.e., thinking the meaning of the words) which he must make to understand and interpret correctly what the author has said.

To facilitate this comprehension phase of the learning process, many improvements in the method of presenting the reading materials have been made. The word and sentence method of learning the words was invented and used, more to make sure that the proper meaning reaction would be made by the learners than to facilitate the recognition of the language symbols. Moreover, all the modern methods of teaching reading,—the rational, synthetic, and the various forms of phonic and phonetic methods,—start with *action words* or words that express a thought. In this they represent attempts to get the learner to make the proper *meaning response* at the same time that he is learning to recognize the printed word. This has been done because the real goal of the pupil in this stage of the learning is to recognize promptly the printed words and to have these printed words arouse the exact meanings which they represent.

A second advantage of the visual method of learning to read is that practice in making the exact type of response that is to be used is given throughout; namely, the understanding and proper interpretation of the words that convey the author's thought. No wrong habits need to be unlearned. If you start with *oral* reading or with the pronunciation of the words, the habit of articulating the words, which was used as the successful stimulus for arousing the correct meaning response in the earlier stages of the learning, must be eliminated at some later stage.

The advantage of the *oral* method of learning to read is that it gives drill and practice in oral speech. Such practice is needed to perfect this neglected phase of language development. The chief disadvantage of the oral speech method of learning to read lies in the fact that it will prevent most of those who learn to read by this method from ever reaching the highest levels of skill in silent reading, for the habit of articulating the words is very difficult to eliminate. In fact, most readers never succeed in eliminating it, and it has been shown by many investigations that the actual or incipient pronunciation of the words always retards the rate at which a student can read.

Whether the oral or the visual method is used to attach the appropriate meaning to the printed language symbols, new words are continuously being encountered by learners. Some method of mastering these new words must, therefore, be acquired.

4. VARIOUS METHODS THAT HAVE BEEN USED TO TEACH NEW WORDS

The following methods of mastering new words have been invented and used by teachers in helping their pupils in learning to read. These methods should be viewed and evaluated by teachers who are using them, or some modification of them, not merely in the light of the help which they give for mastering this particular problem, but in the light of the effect which each method will have on the learners' ability to attain the ultimate goal of the reading process.[5]

(1) The Alphabet Method of Learning New Words.—New words may be learned by making an analysis of the word. The earliest method of teaching reading which used this device for mastering new words was the alphabet method. Here the letters were learned first. Then the word was mastered by spelling and by pronouncing it. The meaning of the word was aroused by its pronunciation and was attached to the printed form of the word by the principle of conditioning. The establishment of this new linkage was made possible because the pupil had already learned to link a particular meaning response to the sound of the word which he had learned in his mastery of oral speech. New words could, therefore, be learned by spelling them and by learning to pronounce them.

(2) The Phonic and Various Phonetic Methods of Mastering New Words.—Words are, however, rarely pronounced according to the sound of the names of the letters that compose them. Various types of phonic and phonetic methods have, therefore, been devised for making a "sound" analysis of the printed words. The fundamental sound groupings are learned by the method of conditioning explained in the preceding section of this paper. This gives the learners a key for analyzing and pronouncing *new* words. In all methods of this type, the words are analyzed into their sound elements and the meaning is linked by the principle of conditioning to the pronunciation of the word.

There are many varieties of phonic systems and phonetic methods of mastering new words. To give the learners help in solving the other problems with which they must deal, this phonic method of word analysis is often combined with the "word," the "sentence," or even the "story" method of teaching beginners to read. It has often been made very formal and artificial because the learning of the sound elements has

[5] For statement of the goal to be attained in learning to read, see article by Book, W. F. "Analysis of the Task of Learning to Read," *Journal of Educational Research*, XXI, (January 1930), pp. 1-6.

been made an end instead of a means for aiding the pupil in mastering new words. This regularly occurs if the primary teacher is more interested in the study of language than in children or in the problem of helping them learn to read.

Since certain sound units occur again and again in most of the common words and are combined in forming new words, this phonic method of analyzing words becomes a very effective means for *mastering new words*. It is, therefore, an aid for interpreting the meaning of words where the learning starts with oral reading, because oral reading uses the sound of the word to arouse the correct meaning response for the printed words. It, however, introduces the habit of analyzing and pronouncing the word which must be eliminated at a later stage of the learning process and is, therefore, not the most efficient method of learning new words.

(3) The Word Method of Mastering New Words.—New words may, of course, be learned one at a time by applying the principle of conditioning and utilizing the law of combination as was described in the preceding section. This has been called the word method of teaching reading and is a very sure and economical way of acquiring an initial supply of familiar words that can easily be recognized and correctly interpreted. In the later stages of the learning where this method is used, new words must be learned from the context because of their repeated associations with different groups of words. A word that can be recognized when standing alone or in a certain context may not be recognized and may not awaken the proper meaning response if surrounded by a different set of words. A long or new word may on the other hand, be clearly distinguished from the short and familiar words by means of which it is learned so that it may be named and correctly interpreted. After these new words have been observed in a variety of different groups of words that are well known, they become familiar and can be readily interpreted when standing alone or when found in other contexts. New words may, therefore, be learned by seeing them in a variety of groupings of familiar words.

(4) The Phrase and Sentence Method of Learning New Words.—A whole phrase or thought unit may, however, be recognized by a learner as readily as a word or sound unit, and the correct meaning may be linked to these larger units by the method of conditioning already described. By combining the phrase method with the word and sentence method of learning to recognize and interpret the meaning of words,

new words may be learned by introducing them gradually into the sentences read and by having them appear in a variety of combinations. By the process of analyzing these sentences into their word and phrase units and by comparing the printed forms of these various language units, this practice soon enables the learners to recognize and interpret the meaning of all the new words which are found in the sentences read, provided they are not too numerous.

If sufficient care were given to the selection and arrangement of the reading materials used for the practice, this *context* method would be effective for learning all the new words encountered in the reading practice.

By a process of comparison and analysis, the children come to recognize by sight, the sentence, the phrases, and even the words which represent the smaller thought units. The advantage of this method of learning new words lies in the fact that it follows the natural course of all perceptual learning which starts with the whole or an over-view of the thing to be investigated, and ends with a more or less detailed analysis of the thing observed. In this way children soon acquire a stock of familiar words which may be used in learning other words from the context. Later, this method of learning new words may be speeded up by the use of the dictionary. But as J. B. Kerfoot [6] has pointed out, the real meaning of a word can never be learned from the dictionary.[7]

(5) The Story Method of Teaching New Words.—One other method, often used to teach reading, should be mentioned in this connection. The *story method* capitalizes the pupil's interests and experiences still more than the phrase or sentence method. Here the teacher associates the pupil's experience, by means of conversation, pictures, and acting, with a group of sentences that tell a story. The various sentences are then rearranged in the story in all sorts of ways until the child learns to recognize each one of them quickly and correctly. Since the whole process starts with the meaning, the learner is sure to associate the proper meaning response with these language units. He also learns in

[6] Kerfoot, J. B. *How We Read.* Boston: Houghton Mifflin Co.

[7] The word, phrase, or sentence method may, of course, be combined with the phonic or with any successful form of phonetic method to give the pupils help in their analysis and mastery of new words. The important thing to keep in mind is the actual problems which confront the learners of this subject, for the learners should be given the kind of help they need to solve all of these problems in the most efficient and economical way possible for them.

this way to recognize the phrases and finally the words which compose each sentence. This soon gives the learner a vocabulary of sight words by the principle of conditioning and by the analyses and comparisons that have been made in learning to recognize these sentences and words.

Here, as in the phrase and sentence method, new words must be learned from the context in the way described in paragraph four above, or by supplementing this procedure with some one of the many phonic devices which give, through the *oral* speech channel, a means for analyzing and interpreting the meaning of new words.

It should, however, be added that the best of all these methods start with the child's experience and the thought which the words represent. This method is used throughout to motivate the learners, and as an aid for learning it is used to recognize and interpret the language symbols, including the new words encountered in reading.

5. DIFFICULTIES WHICH THE LEARNING OF NEW WORDS PRESENTS

Learning to recognize new words, and gaining sufficient control over the eye movements to follow a line of print and to keep one's place on the page while observing the words, is generally spoken of as the mechanics of reading. Mastering the problems which this phase of the learning process presents gives rise to certain difficulties for all learners of this subject and presents a number of special problems for certain individuals. These difficulties must all be successfully dealt with by the teacher if the learner's progress to the higher levels of learning is to proceed unimpeded. A complete and accurate list of these difficulties should, therefore, be determined by careful experimentation and by making systematic observations to find out (1) what these difficulties are; (2) at what stage in the learning they occur; (3) their cause and relative importance; and (4) how they may be prevented or overcome. The following suggestions may serve as a beginning for the solution of this problem as it pertains to the mastery of new words in learning to read.

1. Some successful method of mastering new words must be found and used until a complete working vocabulary is acquired. No pupil can successfully pass to the higher levels of learning, where he must give his entire attention to what the author is saying, if he does not have a sufficient mastery over the process of interpreting the words used by the author.

2. Much trouble for the learners who fail to master this problem comes from insufficient phonic work (if this method has been used to master the words), or from the fact that two or more phonic systems have been used because the child's teacher has been changed one or more times before he has learned to read. This regularly happens because few teachers use the same phonetic method to teach new words.

3. Most of the trouble in acquiring a successful method of mastering new words arises, however, from the fact that teachers do not have a clear idea of just what is to be done by their pupils while learning to read. Consequently they are unable to help their pupils find the most successful ways of performing these necessary tasks.

4. Most trouble in the mastery of this and other problems encountered by learners of this subject arises from the fact that the methods of teaching employed merely help the learners solve a particular problem at a certain level of skill regardless of the effect which this method of directing the learners will have on the solution of the problems encountered at the higher levels of skill. Teachers and the designers of methods of teaching reading too often forget that all the problems encountered by the learners at any stage of skill should be solved in a way that would aid rather than retard the learner's progress when he reaches the highest levels of skill in that particular instance of learning. It is in giving help on such problems as these that a careful analysis of the learner's task in every instance of learning proves most helpful and valuable for educational theory and practice.

ANALYSIS OF EXPERIMENTAL STUDIES IN HOMOGENEOUS GROUPING

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The group or class method of instruction, developed by Canon La-Salle in 1680,[1] has been a vital agent in the popularization of education. Criticisms against it have been as legion as the attempts to modify and improve its efficiency. The increased recognition of individual differences has directed attention to the improvement of instruction along two distinct lines. The first line of improvement is characterized by a reversion to individual instruction. This movement received its original impetus from the work of Frederic Burk at the San Francisco State Normal School,[2] and is now represented by the Winnetka plan. The second line of improvement is based upon ability grouping. Better adaptation of methods and materials, varying rates of progress consistent with the ability of the students, reduction of failures, keener interest on the part of students, and better work have been given as arguments for ability grouping. The social and psychological factors of this problem have been discussed by Freeman.[3]

Forty cities of 100,000 population or over, and eighty-eight cities of 30,000 to 100,000 population reported in 1926 the use of ability grouping in the elementary grades or high school or both.[4] The purpose of this paper is to summarize the experimental evidence bearing upon the efficacy of ability grouping. No claim is made that the analysis is exhaustive, yet the authors feel reasonably sure that it includes all the important studies to date. A summary of the analysis is represented in Table I. These data are discussed under the following headings:

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[1] Holmes, W. H. *School Organization and The Individual Child.* (The Davis Press, 1912), p. 12.

[2] *Twenty-Fourth Yearbook* of the National Society for the Study of Education. (Bloomington, Illinois: Public School Publishing Company, 1925), p. 59.

[3] Freeman, F. N. "Sorting the Students," *Educational Review*, LXVIII, (November, 1924), pp. 169-174.

[4] City School Leaflet, No. 22. Washington: United States Bureau of Education, December, 1926.

TABLE I

Analysis of Studies in Homogeneous Grouping

Date of Study	Number of the Study	Grade or Subject	Number of Pupils	Basis for Grouping	Methods of Evaluation	Control Group Used?	Results
1920	1[a]	Junior H.S.	....	Mental test and marks	Number of failures	no	Fewer failures
1920	2	Reading in Grade 2	....	Mental age and physical age	Objective tests, percent of gain	no	All groups gained in rate of reading. Low group gained most in comprehension.
1920	3	Grade 1	96	Mental test	Number of promotions	no	Not clear. Arguments favor sectioning.
1922	4	Grade 7B	....	Mental test	Standard objective tests	no	Superior groups scored 1½ to 2 years above the slow groups, although some slow groups outscored some superior groups. Great variation.
1923	5[b]	Grade 9	....	Mental test and chronological age	Number of failures, final marks, and subsequent marks	no	No increase in failures, subsequent marks better.
1923	6	Grades 6, 7, 8	....	Teachers' marks	Questionnaire to teachers	no	Preponderance of objections to homogeneous grouping.
1923	7[a]	Elementary psychology	333	Mental test	Marks at the end of the quarter	yes	First semester—no difference, second semester—bright group gained if "pushed."
1924	8[a]	English I, English III, Ancient History Geometry	....	Mental test and marks	Scores on special tests and marks	yes	In Geometry, English I and English III the low group benefited. In Ancient History the high group gained most.
1924	9	Algebra, Latin I	....	Mental test	Objective tests	yes	Superior pupils had a slight advantage in Algebra.
1924	10	Arithmetic and Reading	....	.....	Objective tests	no	Slow pupils gained two years in one in achievement.
1926	11	Grades 1 to 12	....	Mental age and educational age	Reduction of failures and under—and overageness	no	Failures reduced 41% in Grades 1 to 6 and 18% in Grades 7 to 12. In Reading 82% had normal ability for the grade.

TABLE I—Continued

Date of Study	Number of the Study	Grade or Subject	Number of Pupils	Basis for Grouping	Methods of Evaluation	Control Group Used?	Results
1926	12	Elementary	186	.....	Number of failures	no	Out of 186 accelerated pupils, less than 5% failed of promotion.
1926	13	College physics	87	Marks	Marks	no	Bright student had the opportunity to progress faster.
1927	14[c]	Grades 7 and 8	188	Mental age	Objective tests	yes	No clear cut advantages for segregation.
1927	15[c]	.....	80	Reading rate and comprehension	Objective tests	yes	Experimental group gained more in rate and comprehension.
1927	16	Latin I, Mathematics	....	Marks	Number of failures and final marks	no	In Latin, 30% decrease in failures, in Mathematics, no difference in the number of failures.
1928	17[c]	Grades 4B to 7B	1466	Mental test	Standard deviation difference	yes	Advantage for the average and superior groups when segregated.
1928	18[c]	English I	109	Mental test	Objective tests	yes	Definite advantage for slow segregated group, slight advantage for medium segregated group, and a disadvantage for bright segregated group.
1929	19[c]	Grade 1	110	Mental test	Objective tests	yes	No clear cut gains for any segregated group.
1929	20	Grade 1	126	Mental test	Objective tests	yes	Greatest accomplishment in mixed groups.

[a]See bibliography for author, title, and reference.
[b]This study included 728 pupils in Algebra, 711 in English, 330 in Latin, and 304 in French.
[c]This study gives some statistical treatment of the results to establish the reliability of the differences.

1. *Grades included.*—Ten of the studies confine themselves to th junior or senior high school, grades six to twelve; seven are confine largely to the elementary grades; two pertain to college work; the grade included in one are uncertain.

2. *Basis for grouping.*—Many of the studies did not rely upon on single criterion as the basis for classification. Various combinatio of mental age, achievement scores, teachers' marks, etc., are found. Fou teen studies employed, in some form or other, the results of intelligen tests; four used teachers' marks; two used achievement tests; and on used the chronological age.

3. *Methods of evaluation.*—Six of the authors evaluated the merit o their plan on the number of failures and promotions to higher grade four of them used teachers' marks (the percent of A's, B's, etc. grante in each group); and nine reported the use of objective tests. Ten of th studies did not report the use of control groups. Pre-tests, that is, th tests given before the experiment was carried out, were not used in eleve instances; thus the outcomes could not be expressed in terms of gains i achievement.

4. *Reliability.*—In rating the studies included in this summary, n detailed techniques have been used to determine the statistical reliabilit of any of them. Even with the application of such simple criteria as th use of a control group, pre-tests, objective measures to determine out comes, and statistical treatment of results, only seven of the studies meri consideration.

5. *Results.*—Before presenting an analysis of the outcomes of th seven which represent varying degrees of acceptability, it may be de sirable to raise a few pertinent questions. What shall we accept as a good basis for classification? If grouping is made by mental age, ra score on intelligence tests, or percentile rank on intelligence tests, th same group contains pupils whose mental maturity is somewhat the sam but whose rate of learning, as manifest by the IQ, varies greatly. I classification within a grade is secured by grouping together pupils o like IQ, then wide ranges in mental ages may be found. Is either situa tion desirable? Some teachers use school marks, either in the same sub ject or a composite of marks, as the basis for forming ability groups Where a composite score representing marks over an extended period ar used, it has been found rather satisfactory.[5] Scores on objective achieve

[5] Brooks, F. D. "Sectioning Junior High-School Pupils by Tests and Schoo Marks," *Journal of Educational Research*, xii, (December, 1925), pp. 359-369.

ment tests are also used in some instances as a basis for grouping. This brings together pupils of approximately the same achievement, but of varying mental age and IQ. Kelley[6] suggests that a comprehensive achievement test measures essentially the same capacities as a good intelligence test which would suggest efficacy of this method of grouping. Where pupils are grouped, however, for instruction in one subject only, like algebra, the technique may need to be altered.

Another problem which needs consideration is the basis on which the merit of homogeneous classification is to be judged. If the relative number of A, B, C, or D grades, or the number of failures, or the percent of promotions are used, it seems apparent that the experiment is foredoomed. This raises the question as to the extent to which teachers' marks are an index of achievement. Van Wagenen, in comparing the objective achievement scores of pupils in the thought and information phases of American history, says, "It is clear that many of the pupils with the highest scores receive only average marks, while many with average scores receive the highest marks. Surely the relation between attainment and teachers' marks is far from being a close one."[7]

Where a project in homogeneous grouping has been introduced to reduce failures, it would be quite absurd to evaluate an experiment in terms of reduction in the number of failures. Equally ridiculous is the notion that ability grouping can be justified because the achievement of groups of high ability is greater than those of low ability. Experimentation is hardly necessary to demonstrate that. The nature of the problem assumes that pupils in segregated sections are to be compared with pupils of corresponding ability in mixed groups.

It seems, then, that the only acceptable measure of the effectiveness of grouping is in achievement of comparable groups. But even this is not devoid of controversy. Shall the gains be expressed in terms of raw score units, T- or C-score units, the percent of initial score, the percent of possible gain, or some other way? Other writers have discussed certain aspects of this problem.[8]

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[6] Kelley, Truman L. *Interpretation of Educational Measurements*, (World Book Company, 1927), p. 21.

[7] Van Wagenen, M. J. *A Teacher's Manual in the Use of Educational Scales*. (Bloomington, Illinois: Public School Publishing Company, 1928), p. 59.

[8] Kincaid, Margaret. "A Study of Individual Differences in Learning," *Psychological Review*, xxxii, (January, 1925), pp. 34-53. Stoddard, G. D. "The Problem of Individual Differences in Learning," *Psychological Review*, xxxii, (November, 1925), pp. 479-485.

In the light of the above discussion it is difficult to formulate a summary of the outcomes of the studies represented in Table I. Burt, *et al*, note no significant differences in the correlations between intelligence and achievement when all groups, segregated as well as controls, were taught by the same method and at the same rate. During the second semester when the high and medium groups and their controls were "pushed," covering the work in thirty hours instead of thirty-seven, there was a distinct advantage for the high and medium segregated groups. The use of final marks as a measure of success in the course makes one question the value of the study.

Van Wagenen studied the effects of segregation upon the achievement of superior pupils in grades seven and eight. The results showed small differences; in some cases the mixed groups were ahead. Apparently, homogeneous grouping has been no advantage to these pupils.

Dvorak and Rae studied the achievement of a group of superior segregated first-grade children. Objective tests were used throughout the study. He concludes that mere segregation of bright pupils into homogeneous groups without proper adaptation of methods and materials produces negative or indifferent results.

The most extensive study in this field has been conducted by Billett. This study included, during the first year, 109 pupils in ninth-grade English. His data show that in four cases out of five the difference of the mean gains is in favor of the slow homogeneous group. In three cases out of five the difference of the mean gains is in favor of the average homogeneous group. In four cases out of five the difference of the mean gains is in favor of the fast heterogeneous group. Only two of the ratios are above 1.0; ten out of fifteen of the critical ratios are less than 0.50. The difference in gains are probably not significant, and do not warrant his conclusions that homogeneous grouping is advantageous to pupils of low and average ability. The fact that a repetition of the experiment the second year corroborated the conclusions of the first year is, however, of some importance.

While the evidence is contradictory, at least two of the studies suggest that ability grouping is quite ineffective unless accompanied by proper changes in method. Unless adaptation of methods and materials is a necessary correlate to ability grouping, one of the purposes of the project is defeated. Homogeneous classification makes possible but does not insure such adaptation.[9] The tendency, all too often, is to use exactly

[9] Miller, W. S. "The Administrative Use of Intelligence Tests in the High School," *Twenty-First Yearbook* of the National Society for the Study of Education, Part I, pp. 189-223.

the same method for the different sections. Unfortunately, we do not yet know enough about differences between methods of instruction for the different levels of ability to make proper adaptations. If it is true that in the conventional school to-day the achievement of the slow pupils corresponds much more closely with their mental level than does that of bright pupils, then our present methods must be quite efficacious for the dull pupil.[10] Possibly the future may bring equally efficient instruction for the bright pupil.

Of course, none of the studies has attempted to measure any outcomes except pure achievement. It may be that the social and psychological advantages coming out of homogeneous classification will justify the practice of homogeneous grouping even though there is no significant difference in achievement.

If one were to make a final summary statement about the studies represented in Table I, one would have to say that, so far as achievement is concerned, there is no clear-cut evidence that homogeneous grouping is either advantageous or disadvantageous. The studies seem to indicate that homogeneous classification may be effective if accompanied by proper adaptation in methods and materials.[11]

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[10] Wilson, W. R. "The Misleading Accomplishment Quotient," *Journal of Educational Research*, xvii, (January, 1928), pp. 1-11.

[11] Since this article went to press another experimental study has come to our attention, namely, Purdom, T. L. *The Value of Homogeneous Grouping*. Warwick and York, 1929.

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A STUDY OF THE CAVD INTELLIGENCE EXAMINATION [1]

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IN Thorndike's recent volume, *The Measurement of Intelligence*, he describes in detail the construction of a new scale for measuring intellect, or as he prefers to call it, a "segment" of intellect. This scale, briefly called CAVD, consists of tasks involving sentence-completion (C), arithmetic problems (A), vocabulary (V), and directions (D), the last test requiring the reading and comprehension of sentences and paragraphs. Forty composite tasks—10 each of C, A, V, and D—are placed at each of the 17 levels of difficulty ranging in equal steps from level A to level Q, or from a difficulty-level that an individual whose mental age is 3 years can just succeed with (i.e. 50 percent correct) to one that only 1/5 of college graduates can succeed with. Besides furnishing a more extensively graduated range of difficulty than any other intelligence scale, the test also permits, for the first time, measurements from an empirically determined "absolute zero" of intellect. Thus it is superior to the usual intelligence examination since individuals may be compared with respect to absolute ability in the functions measured by the scale.

Except for certain preliminary studies chiefly concerned with the construction and standardization of the CAVD scale, there are no published data on the relationship of this test to measures of school achievement. This is largely because the scale is, as yet, not generally available. So far, too, only one form has been constructed.

The present study was planned with the idea of adding somewhat to our knowledge of the CAVD by computing correlations between the upper five levels (M, N, O, P, Q) and college grades in the various required freshmen subjects. Incidentally, it was hoped that some light might be thrown upon the constitution of that "segment" of intellect measured by CAVD by an examination of the intercorrelations of its parts, as well as the relation of these parts to college grades.

Our experimental subjects were 338 freshmen girls in the Brooklyn Branch of Hunter College, New York City, to whom, with the coöperation of the Dean and Staff, the upper five levels of CAVD were

[1] The writer is indebted to Misses Anne Klein and Mary H. Duke for the statistical work of this paper.

given in January, 1928. The examination lasted from 9 A.M. until 3 P.M. with one hour off for lunch. CAVD is not a speed test and unlimited time should be allowed. Five hours are probably enough, however, to secure an accurate measure of ability. There is some evidence,[2] as yet unpublished, to show that the extra time after the first two or three hours is of little value in increasing a testee's score. In the present case, most of the freshmen were convinced by 2 P.M. that they had done all that they were capable of, but most of them remained until time was called. The ages of the girls ranged from fifteen years four months to twenty-three years five months with a mode at 17 and 18 years. Twenty-four records had to be discarded; fourteen were of students who had entered Hunter College with records from other colleges that could not be combined with the Hunter records; the remaining ten had incomplete records due to illness, the dropping of courses, etc. Of the 314 girls whose records were used, 305 were educated in the New York City High Schools, only nine coming from out-of-town schools. The group was made up predominantly of Russian and Polish Jews with a sprinkling of Italians and Irish. Parents of 78 percent of the group were born in Europe, and parents of 15 percent were born in America. The remaining 7 percent each had one parent born in America and the other parent born in Europe.

In Table I are reported the correlations between the total scores on levels M, N, O, P, and Q of CAVD and the first semester grades in five required freshmen courses: English, Social Science (History or Economics), a classical requirement (Latin, Greek and Roman Civilization, or a survey course in English), one modern language (German or French), and mathematics. In addition to the correlations between total CAVD and the specific courses, the correlation between CAVD

TABLE I

THE CORRELATIONS OF TOTAL CAVD SCORES (LEVELS M, N, O, P, AND Q) WITH ACADEMIC GRADES AND WITH A COMPOSITE INDEX

N= 314

	English	Social Science	Classics	Mathematics	Mod. Lang.	Index
CAVD	.57	.33	.28	.28	.23	.41

and an Index made up of all five course-grades was determined. This Index-number was based upon all of the grades earned by the student

[2] I am indebted to Dr. Ella Woodyard, of the Institute of Educational Research, for this information.

during the first semester. Four points were allowed for a grade of A, three for a B, two for a C, one for a D, and no points for an F. After a student's grades had been given their appropriate weights, each was multiplied by the credit-value of the course and the sum divided by the number of credits taken (usually 15) to give the Index-number. The average Index was 2.24 with an SD = .81. The average CAVD score was 105.5 with an SD = 27.3, and a range from 53 points to 160 points. These CAVD scores, it must be remembered, were based upon the upper five levels only—for which the highest possible score is 200—and are not reckoned from the "zero point." This will not, of course, affect the correlations in Table I, but an individual's score is not a measure of his absolute level or "altitude" on the scale. For correlational purposes, the college grades were assigned arbitrary weights: A = 45; B = 35; C = 25; D = 15; and F = 5. This follows the practice of Wood[3] and Flemming.[4]

In Table II the correlations of the separate parts of the CAVD with academic grades and indices are shown. Six records were discarded in these computations, because they contained one or more F's due to absence from the course and not to poor work. Their inclusion, however, would not have affected the figures.

TABLE II

CORRELATIONS BETWEEN THE SEPARATE PARTS OF CAVD (LEVELS M, N, O, P, AND Q) ACADEMIC GRADES AND INDICES

N = 308

	English	Social Science	Classics	Mathematics	Mod. Lang.	Index
C	.53	.33	.23	.11	.17	.39
A	.32	.19	.24	.30	.20	.36
V	.42	.24	.23	.08	.17	.29
D	.44	.30	.20	.21	.18	.34
Av. r	.43	.27	.23	.18	.18	.35

Tables I and II are consistent with each other inasmuch as the correlations of either the total CAVD or its parts are highest for English and Indices and lowest for Modern Languages and mathematics. In no case are the correlations high enough to be of any value for prediction. The $r = .41$ between CAVD and Indices is about equal to the r's found between intelligence test scores and college grades in other studies,[5] but is somewhat lower than the r's found by Wood[6] and

[3] Wood. *Measurement in Higher Education*, (1923), page 65.

[4] "The Predictive Value of Certain Tests of Emotional Stability as Applied to College Freshmen," *Archives of Psychology*, (1928), pages 21-22.

[5] See the *Twenty-First Yearbook* of the National Society for the Study of Education, 1922, article on "Intelligence Tests in Colleges and Universities," by Guy M. Whipple.

[6] *Op. cit.*, pages 97-106; 316-319.

Flemming[7] between the Thorndike Intelligence Examination for High-School Graduates and grades at Columbia College. As is well known, this lack of relationship between measures of intelligence and college grades is due to many causes. Important among these causes are the unreliability of grades, and the obvious fact that a college grade is a complex of factors in which native intellectual ability plays a large but by no means an exclusive rôle. The fact that CAVD draws heavily upon language and verbal ability (C, V, and D are all "verbal tests") is shown clearly in our tables.

It was thought that something might be discovered as to the homogeneity of the upper five levels of CAVD from the intercorrelations of its four parts. These r's are given in Table III together with the averages and the SD's of each part. In each separate test, the average and the SD are based upon a total of fifty items.

TABLE III

INTERCORRELATIONS OF THE FOUR PARTS OF THE CAVD, LEVELS M, N, O, P, AND Q

N = 313

	C	A	V	D
C	—	.21	.58	.48
A	.21	—	.21	.38
V	.58	.21	—	.57
D	.48	.38	.57	—
Averages:	26.02	28.95	22.91	27.12
SD:	8.30	8.35	6.70	5.15

The averages in Table III indicate that levels M, N, O, P, and Q, of CAVD are fairly homogeneous with regard to difficulty, although A is slightly easier and V somewhat harder than the other tests. It seems clear, however, that A is not measuring the same thing as C, V, and D. The average intercorrelation of C, V, and D is .54; while the average intercorrelation of A with C, V, and D is .27. The correlation of .38 between A and D is most readily explained, perhaps, by the evident fact that in both of these tests—to a much greater degree than in C and V—the ability to understand and follow fairly difficult verbal directions is required. Before one can solve arithmetic problems, for instance, he must first understand what is to be done; and before he can answer the questions on the reading selections he must understand the gist of what he has read. That this factor (if it may be called that) constitutes a real "bond" between A and D and is not simply "verbal ability" seems clear from the partial r's between A and D for C and V "constant." For

[7] *Op. cit.*, page 22.

$r_{AD} = .38$, $r_{AD.C} = .33$, $r_{AD.V} = .33$, and $r_{AD.CV} = .32$. The correlation between A and D is but little reduced by "ruling out" verbal ability in the form of tests C and V. It seems clear, furthermore, that this "directions" bond between A and D accounts for most, if not all, of the correlation which appears between A and C or A and V, since $r_{AV.D} = .00$, and $r_{AC.D} = .04$. These results are consistent with recent evidence [8] to the effect that "verbal ability" (defined loosely as the ability to use words and manipulate language relations) and "number ability" (aptitude in handling quantitative concepts) are really independently varying traits. If this be true, such correlation as appears between language tests (e.g., C, V, D) and arithmetic (A) must be entirely due to the verbal directions in which the arithmetic problems are inevitably expressed. Substantiation of this view is seen in the almost negligible influence of A upon the correlations of C, V, and D. Comparing the total r in each case with its partial, we get:

$r_{CV} = .58$	$r_{CV.A} = .56$
$r_{CD} = .48$	$r_{CD.A} = .45$
$r_{VD} = .57$	$r_{VD.A} = .55$

When A is rendered "constant," the intercorrelations of the strictly verbal tests are scarcely affected. We are forced, then, to conclude that A is measuring something very different from C and V and largely different from D, and that the total CAVD score is hardly a measure of a homogeneous entity which may be truly called "general intelligence."

CAVD and the stock tests of "general intelligence" doubtlessly must measure to a large extent, verbal or language aptitude, which accounts for their correlations with each other and with school grades. Especially must this be true when intelligence tests are administered to young children. Terman [9] has written that his "statistics show that in a large majority of cases the vocabulary test alone will give us an IQ within 10 percent of that secured by the entire scale." Other evidence for the view that for children, at least, "general intelligence" is synonymous with verbal ability may be found in Tables 132 and 133 of Thorndike's *Measurement of Intelligence*. In Table 132, the r for 100 University students between completion-paragraph reading and arithmetic problems

[8] Schneck, M. R. "The Measurement of Verbal and Numerical Abilities," *Archives of Psychology*, 1929.

[9] *The Measurement of Intelligence*, 1916, page 230.

is .28 and the r between vocabulary and arithmetic problems is .23, while in Table 133 the intercorrelations of CAVD for 126 fifth-grade children are $r_{CA} = .64$, $r_{VA} = .52$, $r_{AD} = .52$—much larger than the correlations found in the present study. For young children—and to a lesser but real degree for older children as well—almost all intelligence tests are language tests; even the ability to solve arithmetic problems depends as much on reading and understanding the problem as upon skill in the use of number concepts. This identification of general intelligence with language aptitude is less true of college students and adults, in whom more highly developed language habits permit the functioning of other previously obscured factors. It would seem, therefore, useless to attempt to disentangle the independent factors operating in children's scores on general intelligence examinations because of the enormous overlay of language. Probably it is only in the upper levels of CAVD and like scales that other factors, besides verbal ability, operate with sufficient strength to permit differentiation and to render doubtful the meaning and value of a total or composite score.

A CRITIQUE OF PUBLIC SCHOOL COURSES OF STUDY 1928-1929

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WHAT follows is an attempt to make an appraisal of the output of public school courses of study for the years 1928-1929. For this purpose the collection of courses deposited in the Bureau of Curriculum Research at Columbia University was used because it is the largest available at any one location. Courses of study which bore no dates, although they were received recently, were not included. Two hundred-forty-two courses of study were available at the end of June, 1929, which I should estimate to be a little over half of the complete output up to that time. This amount is a sufficiently large sampling of the total to reveal the present tendencies in the preparation of curriculum bulletins. In particular, the following elements were studied: the typography, the inclusion of a procedure, the inclusion of objectives, the form of a unit of work, the inclusion of tests, the provision for adapting instruction to individual differences, and other tendencies. The difference between this study and others of its kind is that it examines the products of programs of curriculum revision as opposed to the statements of plans in response to interviews and questionnaires. The value of the present curriculum-making movement can be measured only in terms of its influence in practice upon the American public schools. It is, therefore, interesting to study this influence as far as the courses of study of the nation reveal it.

THE CHARACTER OF THE OUTPUT OF COURSES OF STUDY

Table I shows the distribution of the output of courses of study among the various subjects. In the absence of tabulations for preceding years, it is impossible to observe any special tendencies. A few speculations, however, suggest themselves. There appear to be more geography courses than either history or social studies. The total of separate courses in history and geography is more than twice the total of integrated courses in the social studies. These facts seem to indicate a hesitancy to treat the social studies as an amalgamated course. There is a comparatively abundant output in the fields of music and art, while the courses of study in health and physical education also have a

comparatively large total. Art, health study, and physical education were evidently neglected several years ago and an effort is now being made to catch up.

The total product of curriculum bulletins is made up of 107 elementary, 39 junior high-school, 37 junior and senior high-school combined, and 49 senior high-school publications. The output of courses of study as a whole in 1928 seems to be a little lower than the average for the preceding five years. There is some evidence, however, that we may not expect a sharp decline in the next five years. Mr. Cocking's data concerning the curriculum programs of twelve progressive cities show that six of the systems started their present curriculum programs within the last three or four years, and eight of them report a continuous program of curriculum revision. Furthermore, as a result of the influence of the last two Yearbooks of the Department of Superintendence, we may expect increased activity on the secondary level.

TABLE I

OUTPUT OF COURSES OF STUDY (1928-1929)

	All Levels	Elementary	Junior High School	Junior and Senior High Schools	Senior High School
Art	16	7	3	4	2
Commercial	12		1	3	8
Foreign Language	11		3	2	6
Geography	18	14	2		2
Health and Physical Education	19	11	2	6	
History	10	6	1		3
Home Economics	7			5	2
Kindergarten-Primary	5	5			
Language [1]	38	26	4	4	4
Mathematics	27	11	7	4	5
Miscellaneous [2]	6	4	2		
Music	13	9	2		2
Penmanship	5	5			
Practical Arts [3]	9	2	2	3	2
Science [4]	19	7	4	3	5
Several Subjects [5]	14	10	1		3
Social Studies [6]	13		5	3	5
Total	242	117	39	37	49

[1] Includes reading, spelling, literature.
[2] Includes special classes, character, and extra-school activities.
[3] Includes industrial arts.
[4] Includes nature study.
[5] Signifies city and state general courses of study.
[6] Includes three civics courses.

THE INCLUSION OF OBJECTIVES IN COURSES OF STUDY

With respect to the treatment of *objectives* in courses of study, there are three possibilities, the inclusion of specific objectives, the inclusion

of general objectives, and the absence of objectives. Seventy-one and seven-tenths percent of the courses of study state objectives of some kind; of these, 46.3 percent are specific objectives and 25.4 percent are general objectives. Twenty-seven and nine-tenths percent of the courses of study do not include objectives at all. Specific objectives here, mean goals which suggest definite school activities, the accomplishment of which may be measured or observed. From this point of view, the objectives in less than half the courses of study were satisfactory. The general objectives have only limited value for instructional purposes; they offer no aid in organizing a whole course into units of work and their accomplishment is difficult to measure. The general objective is the goal of a main division of a course of study and must be subdivided into its specific objectives. On the whole, the appearance of objectives in courses of study represents the advance that has been made in the last ten years. Five years ago they were fairly common, and ten years ago they did not appear at all.

DESCRIPTION OF ACTIVITIES

It is becoming characteristic of courses of study to include a *procedure* or a statement of directions for conducting units of work. The procedure is an account of what is done by the class; it describes the particular kind of experience in which the pupils engage; what the teacher does; how the group is organized; what construction is done; what observations are made; what direction the discussion takes; what demonstrations are made; what facts or generalizations are developed; and so on. This means that courses of study are becoming bulkier. As a matter of fact, I recorded the actual number of pages of the first 21 courses of study and found that the average number was 140. The shortest course was 24 pages, and the longest was 500 pages. Ten years ago, courses of study were mere outlines of information. To-day they are voluminous treatises on what used to be known as special method.

THE APPEARANCE OF UNITS OF WORK

There is considerable evidence of a tendency to subdivide the work of a grade into units. It is difficult to know whether this reflects any definitely new conception of the nature of school activity, because at the present time a variety of conceptions of a *unit of work* are bidding for adoption. Furthermore, the mere subdivision of a course into units may have no further significance than the subdivision of a course into sections, parts, topics, or lessons. One conception of the unit of work is

a complete experience engaged in by the pupils in the attainment of a single objective or a group of related objectives. Here the goal is the unifying force and the intent seems to be that the goal shall be concerned with a relatively small unit of life activity, such as *to prepare breakfast*. A second conception is that which commonly goes under the name of the Unit Plan or Morrison Plan in which a large subdivision with a principle or concept for its core is systematically treated including the preparation, pupil activities, tests, and remedial instruction. A third conception is that of the subdivision of the work of a grade into a dozen or more problems. Essentially this does not differ from the two preceding conceptions except that the problem takes the place of the objective or of a major topic. A fourth conception is that of large subdivisions of the work of a grade which progress simultaneously with the work in the several formal subjects. In some cases the unit is equivalent to the work of a whole grade, and the unifying force is a center of interest, such as *transportation*.

The Cleveland social science courses are subdivided into large units. The Ironwood, Michigan, home economics course for Grades X, XI, and XII, is organized into units of work. The Denver physics course is divided into seven large units. The Detroit course of study in intermediate school mathematics is divided into about six units per semester, each unit being based on a large problem, such as, "How to protect our property against loss by fire." The Houston, Texas, course of study in elementary science for Grade VII, is divided into five units, each unit being subdivided into about six problems. The Cicero, Illinois, reading course of study is organized according to the Unit Plan, each unit being based on a single theme such as *animals* in reading. The Utah State course is divided into large units. The Portland, Oregon, civics and history course is divided into six or more major problems, each major problem being subdivided into minor problems. The only characteristic which justifies the use of the term, problem, is that the major problem is expressed as a question. The Missouri State course in geography is divided into eight large units, such as "Peoples of Thinly Populated Regions," and each unit is subdivided into about eight parts. The Texas course of study in home economics is subdivided into six large units. The Oakland hygiene course for girls in senior high schools is divided into eleven units. The Okmulgee course of study in American problems is divided into nine units. The use of the term, unit, in connection with the subdivision of the work of the grade is also found in courses of

study of the public schools of Joliet, Illinois; State of Indiana, and San Diego, Cal.

There is a wide divergence of opinion concerning the magnitude of a unit of work. There is nothing seriously wrong with this because the word *unit* is an elastic term. Some units are short and may be completed in several days, while other units are long and require a month, six weeks, or a whole semester to complete. Ordinarily long units which are not subdivided into smaller parts with specific goals, encourage digressions. They do not help the pupil and the teacher to mark definite points of progress and, psychologically, they fail to furnish the motivation which comes from the awareness that one is making definite headway. In the case of many of the long units, a closer examination reveals that they are subdivided into sub-units having implied or expressed specific objectives.

It seems desirable to group the objectives of a course into several main divisions into which they logically fall. For example, the objectives of general science in the eighth grade fall into six main divisions whose headings are—*the home, the environment, living things, community, man,* and *popular theories.* The main division consequently is the largest subdivision of the course of study. Its goal may be referred to as a general objective. Each main division in turn should be subdivided into units of work. For example, in the above illustration, the main division *home* breaks up into seven units of work: *ventilation, clothing, heat, building materials, light, water,* and *household equipment.* The unit of work consequently becomes the smallest subdivision of the course of study and is directed toward the achievement of one objective or a group of related objectives.

THE FORM OF A COURSE OF STUDY

From the point of view of form, courses of study may be grouped into those that are brief, and those that are detailed. The brief courses of study are of three kinds: (1) those in which the work of the whole grade is presented as a unit; (2) those which are merely outlines of information; and (3) those which consist of a bare list of objectives followed by a bare list of activities. The chief difference between the first and the third form is that the former is subdivided into topics and the latter is not. The frequency of the chief forms of the courses of study is given in Table II.

Of the 240 courses of study examined, 38 or 16.3 percent presented the work of the whole grade as a unit. Twenty-eight or 12.1 percent were mere outlines of information. Twenty-six or 11.2 percent included a bare list of objectives and activities. The brief courses as a whole amounted to 92 or 39.6 percent of the total. Such courses are usually published by state or county departments of education and small towns. They generally suggest a superficial attack on curriculum revision. In some cases the lack of completeness in each of the subjects in the grades is due to the necessity of compressing a whole elementary or secondary curriculum into one volume. The 12 percent which are mere outlines of information indicate that the persons responsible for their publication have not been influenced by the curriculum-making movement. When the work of the whole grade is presented within the compass of a score of pages, it is very meager in suggestive material for the teacher. A brief list of objectives followed by a brief list of activities is a very limited aid to the teacher. There is a vague relation between the objective and the corresponding activity. There is no assurance that each unit of work has been planned, tried out and recorded. There still remains the task of organizing the objectives into units in instructional sequence and the fitting of each activity to its appropriate objective. The result is that such a course of study is a very uncertain instrument of instructional guidance.

THE DETAILED COURSE OF STUDY

The detailed course of study may be divided into four types: (1) those containing organized outlines of units of work; (2) courses of study in the form of parallel columns; (3) those containing units in solid paragraphs under four or five headings; and (4) those containing informal accounts of units of work. The organized outline of units of work usually has four or five main headings, such as *objective*, *procedure*, *materials*, and *essentials*. The body of each unit is presented in outline form with the usual numeration and indentation. This is the most common form in use at the present time, there being a total of 66 courses of study of this type or 28.5 percent of the total. It is difficult to say whether this form is favored for its clearness and usefulness, or whether it is merely a lazy way of presenting courses of study, because it does encourage carelessness of expression. The units arranged in parallel columns appear to be second in order of frequency, there being 38 of this type, or 16.3 percent. In effect, the first two forms are alike. They

are both organized under main headings and they are both presented in outline form. The chief difference is that in the *organized outline* the parts of each unit follow each other, one under the other, and in the *parallel column form* the divisions follow each other side by side. The latter form makes an unattractive page and involves a great waste of space. The units of work presented in solid paragraphs rank third in frequency of occurrence, there being 27 of these or 11.6 percent of the total number. This form is a paragraph arrangement and usually an elaboration of the first form.

The informal account of units of work was found in nine courses of study or 3.9 percent of the total. In this form headings are usually dispensed with and the presentation is free and discursive. It has the best literary style and is the most readable. There is no objective evidence which favors any of these forms. From discussions with teachers the organized outline of units seems to be the most popular. In my opinion, however, the organized paragraph is preferable, because it encourages clearness of expression and completeness of detail; it gives the page the most attractive appearance; it conforms to the style most commonly used in printed materials; and it conforms to the normal reading habits of the teachers.

The point of view expressed above may be summarized in these statements: A course of study in a grade or subject should be subdivided into units. The unit presented in the solid paragraph is preferable to one presented in outline. Each unit should be organized under three or four convenient headings. The procedure is a description of the class activity.

TABLE II

THE CHIEF FORMS OF THE UNIT OF WORK IN COURSES OF STUDY
(Total Courses Examined—242)

	Number of Courses of Study	Percent of Total Courses
A. Brief Statements	92	39.6
1. Work of whole grade presented as unit	38	16.3
2. Outline of information	28	12.1
3. Bare list of objectives followed by bare list of activities	26	11.2
B. Detailed	140	60.3
1. Organized outline	66	28.5
2. Parallel columns	38	16.3
3. Organized paragraphs	27	11.6
4. Informal account	9	3.9

ADAPTING INSTRUCTION TO INDIVIDUAL DIFFERENCES

Twenty-two courses of study make some provision for individual differences. Two principal methods are used to adapt instruction to

individual differences: first, modification of units of work for ability groups; and second, individualizing instruction. In either case, it involves a change in pupils' experiences and, therefore, is an appropriate element in course of study making. This is a period of intensive experimentation with methods of adapting instruction to individual differences, which should be reflected in the current courses of study. There are sharply conflicting results concerning the values of ability grouping and individual instruction. The next ten years should develop a solution to the problem. Certain forward-looking school systems, such as Detroit and Minneapolis, are joining in this effort to determine a solution of the problem.

Although ability grouping is quite general in cities and large towns, only a few courses of study contain any suggestions for the modification of units of work for the different ability groups. The Denver Public Schools publish a treatise on the procedures for conducting the slow learning classes. Work-books and other self-instructional materials are beginning to appear. Detroit publishes instruction sheets or job sheets in industrial mechanics. The San Antonio mathematics course for junior high schools consists of instruction sheets. The Detroit course in occupational information is divided into fifteen self-instructional units.

THE INCLUSION OF TESTS IN COURSES OF STUDY

Twenty courses of study or 8 percent included tests in some form. Thus, there appears a slight tendency to include tests in courses of study. Tests have a rightful place in courses of study because they are a part of the instructional procedure. The kind of tests and the kind of practice material that are designed are parts of the total experiences of pupils. The primary purpose of tests is to determine whether goals have been accomplished. Consequently, to make a test, it is necessary to convert the essentials of a course of study into test items. For teachers who do not wish to use stereotyped tests, examples of these objective tests may be introduced as models.

TYPOGRAPHY

The courses of study examined, are equally divided between printed and mimeographed forms, there being 126 printed and 114 mimeographed courses of study. The assumption is that mimeographed courses are tentative or that the small quantity required makes this form more economical. The printed courses of study were rated on a scale

of from 0 to 10 for excellence of typography. Five percent were excellent; 13.4 percent were good; 16.6 percent were fair; 28 percent were barely passing, and 36 percent were unsatisfactory. On the average, the typography of courses of study was barely above passing. There is considerable room for improvement, although the present output represents much progress over that of five years ago in size of type, spacing, and handling of captions.

THE EMERGENCE OF THE CURRICULUM DIRECTOR

There is evidence that in certain large communities there is emerging a new specialist, whose responsibility is to direct curriculum revision. Kansas City has a curriculum director. San Diego has a director of curriculum and research. Oakland lists a director of bureau of curriculum development. Kenosha, Wisconsin, reports a director of curriculum. Los Angeles has a director of division of courses of study. San Francisco lists a chief deputy in charge of curriculum revision. Pittsburgh maintains a department of curriculum study. Minneapolis lists an instructional research department which carries on the work of curriculum revision. Long Beach has a director of the department of the curriculum. There is no clear evidence of the relationship between this new officer and the supervisory staff. If the office of curriculum director effects a separation between curriculum construction and the improvement of instruction, it is a mistake. The Minneapolis and Detroit schools have deliberately set out to avoid such separation. In my opinion the person or persons engaged as curriculum specialists should divide their time between a continuous program of curriculum revision and the supervision of instruction. And conversely, the persons engaged in the supervision of instruction should devote a large part of their time to organized curriculum revision.

CURRICULUM RESEARCH OF THE PUBLIC SCHOOLS

The courses of study analyzed indicate that public school curriculum organizations carry on very little research to determine the specific objectives of the various school subjects. Kansas City conducted an investigation to discover difficulties in arithmetic and made a study of the out-of-school arithmetic activities. Denver carried on a home survey to discover the objectives of industrial arts. Cleveland made a job analysis of bookkeeping and clerical work. These are the only illustrations of actual research carried on by the public schools to determine

specific objectives. Sufficient time has now elapsed to demonstrate, with a few exceptions, that it would be idle to expect any original contribution to the literature of curriculum objectives from the public schools. This is borne out by Mr. Cocking's study of the curriculum programs of twelve progressive cities in which he found only two minor illustrations of research while the judgment of committees, the use of results of research elsewhere, best practice, and the opinion of experts were almost universally used.[1]

Although curriculum research during the first seven or eight years of the present curriculum-making movement has been devoted chiefly to investigations to determine the specific goals in the various branches of study, this task is by no means finished. One is forced to conclude that if progress in determining objectives is to be made, the work will have to be carried on by the University Bureaus of Research, candidates for higher degrees, and by experimental schools. It seems reasonable, however, to expect that the research bureaus of urban districts will concern themselves with such problems as grade placement, the evaluation of new instructional programs, and the adaptation of instruction to individual differences.

CERTAIN NEW TENDENCIES

Several courses of study, in an introductory statement, describe the method used in the process of curriculum revision. This is true of Denver, San Francisco, Long Beach, and the State of Indiana. The latter courses of study were prepared by committees which met in seminar under the direction of professors at Indiana University, Terre Haute Normal School, Ball Teachers College, and Purdue University. The Committees were appointed by the state superintendent upon recommendation of the local superintendents. Such accounts of procedure enable one to make comparison of plans of organization which is essential to progress. Furthermore, it is necessary for the evaluation of courses of study. Modern courses of study are being circulated widely and officials who have foreseen this have taken pains to give the same attention to the procedure as is given in other educational publications.

Besides the publication of units of work, there are few instances of the distribution of other aids for teachers and pupils. The Boston Public

[1] Cocking, W. D. *Administrative Procedures in Curriculum Making for Public Schools.* Teachers College, Columbia University, Contributions to Education No. 329, 1928, pp. 56-57; 102-103.

Schools publish a treatise on character education for secondary schools. The Norfolk, Virginia, public school system publishes a similar treatise for elementary schools on the development of character by various means which includes a number of case studies. Denver publishes a counseling program in the junior high schools, which is merely a discussion of the program. Passaic, New Jersey, prints a chart for guidance in diagnostic and remedial work. Minneapolis publishes a treatise on the method of teaching reading for Grades IV, V, and VI. Detroit publishes and distributes a spelling book for the use of the pupils. Denver publishes a practice book in English. Cleveland publishes what amounts to a text-book for the pupil in the social studies of the junior high school. The last three publications are the first faint rumblings of what may in the future develop into a rebellion to establish the independence of the public school from the publishing industry.

CONCLUSION

If I were asked after examining 242 of the most recent courses of study, to give the essential characteristics of a modern course, I should include the following: 1. It states specific objectives of school work. 2. It includes a procedure or a statement of directions for carrying on school activities. 3. It includes active experiences as well as mental experiences. 4. The whole is subdivided into small parts, called units for convenience. A unit here, is a small subdivision of a course of study which has unity or completeness, and the goal of which is an objective or group of related objectives.

THE INFLUENCE OF CLASS SIZE UPON PUPIL ACCOMPLISHMENT IN HIGH-SCHOOL ALGEBRA

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1. SUMMARY OF LITERATURE AND PREVIOUS INVESTIGATIONS [1]

THE purpose of this investigation is to study the influence of class size upon pupil accomplishment in high-school algebra. The first part of the report summarizes previous studies of class size; the second part reports the results of an experimental study of the influence of class size in second-semester high-school algebra.

Class size as a possible factor in pupil and teacher efficiency was mentioned by writers of textbooks in educational administration, in school surveys, and in the reports of school superintendents and committees, before any controlled studies were made. These writers frequently set up empirical standards of class size, basing them upon experience and opinions. The following statements have been chosen as typical of the sources mentioned:

"In order that the very best work may be done, classes in the school ought not to contain more than from 35 to 40 pupils. When classes are of this size, it is possible for the teacher to give the time and attention requisite to the achievement of the best results." [2]

"The number of pupils in each class should in no case exceed 35. . . . A class of 20 to 30 well-managed gives dignity and the stimulus of companionship and competition to the work." [3]

"All school administrators are agreed that 40 is the super-maximum number of pupils that should under any circumstances be seated in any elementary classroom." [4]

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[1] For other summaries of the literature, and for bibliographies on this subject, the reader is referred to:
Elliott, C. H. *Variations in the Achievement of Pupils.* Teachers College Contributions to Education, No. 72 (1914), 114 pp.; especially pages 47-49 and 56-76.
Hudelson, Earl. "Summarized Report on the Relation of Class Size to Teaching Efficiency." *Pasadena Educational Research Bulletin,* Bureau of Research and Service, Pasadena City Schools. IV, (November-December 1925), pp. 20-26.
Stevenson, P. R. *Smaller Classes or Larger.* Journal of Educational Research Monographs, (Bloomington, Illinois: Public School Publishing Company, 1923), 127 pp.; especially pages 9-25 and 32-41.

[2] Strayer, G. D. *Some Problems in City School Administration.* (Yonkers-on-Hudson, New York: World Book Company, 1916), p. 94.

[3] Brown, John F. *The American High School.* (New York City: Macmillan Company, 1909), p. 161.

[4] Report of the Superintendent of Schools of Lincoln, Nebraska, 1917-19; p. 89.

"The committee believes that 35 pupils are enough for any teacher, and that 30 would be a better number." [5]

In connection with the Salt Lake City survey, Dr. E. P. Cubberley stated that "Twenty-eight to 30 pupils in average membership are nearer to what the elementary schools should average." [6]

William E. Chancellor in 1910 stated that "it is commonly agreed that kindergarten classes should contain not more than 25 pupils, first grade not more than 35, grades two to seven not more than 40, and grade eight not more than 35." He advised still smaller classes in laboratory subjects.[7]

Writers of textbooks on school management have often advised that classrooms be built to accommodate not more than 40 pupils. Harry E. Bennett stated in this connection that "larger classes should never be permitted, and hence no provision should be made for them." [8] Drs. G. D. Strayer and N. L. Engelhardt have made a similar statement: "Larger rooms . . . tempt administrators to enlarge classes beyond the maximum of 40 pupils." [9]

The American City Bureau Report, published in 1921, stated that "A teacher can work most effectively with a small class. When the class is too large it is difficult to give the pupils the personal attention essential to successful teaching. Obviously the subject taught, the ages of the pupils, and other factors will determine the desirable size of the class. Teachers generally agree, however, that the largest class in kindergarten and elementary grades should not exceed 35 to 40 pupils, and in junior and senior high schools 20 to 25 pupils." [10]

"We are told by teachers of primary classes that from 35 to 40 pupils are all that can be taught if the interests of the pupils are to be

[5] Report of the Superintendent of Schools of Melrose, Massachusetts, 1920.

[6] Cubberley, Ellwood P. *School Organization and Administration.* (Yonkers-on-Hudson, New York: World Book Company, 1916), p. 49.

[7] Chancellor, William E. *Class Teaching and Management.* (New York: Harper and Brothers, 1910), pp. 199-232.

[8] Bennett, Harry Eastman. *School Efficiency—A Manual of Modern School Management.* (Boston: Ginn and Company, 1917), p. 21.

[9] Strayer, George D., and Engelhardt, Nicholas L. *The Classroom Teacher at Work in American Schools.* (New York City: American Book Company, 1920), p. 356.

[10] Report of Committee of the American City Bureau, "Know and Help Your Schools," 2nd Report. An Interpretation of Inquiry Number 11 Relating to School Buildings and Grounds, Enrollment, and Size of Class in the National Survey of Urban Public Schools. American City Bureau, March, 1921.

of paramount importance. The teachers of the grammar grades with equal force assert that from 30 to 35 should be the limit for pupils doing that grade of work. In high school the teachers with equal vehemence assert that classes of from 25 to 30 are all that a teacher can handle successfully, and a much smaller number is preferable."[11]

A report by a committee of the California Education Association in 1918 states as the concensus of teachers' opinions that classes should not be larger than 35 in the grammar grades, nor larger than 30 in the primary grades. Teachers stated that there is too little competition in classes of less than 20, and that overcrowding, lack of attention, and too early elimination result in classes of 50 or over.[12]

The Committee on Class-size of the modern language teachers of New York City in 1921 found 10 percent of their classes with more than 38 pupils, the number set as a maximum by the administration. The report states: "Conditions of this sort are discouraging to pupils and the despair of teachers. Pupils of high-school age cannot be taught *en masse;* they must have individual attention. They cannot learn to pronounce a foreign language unless they have frequent opportunity to recite. In a class of 40, with a period seldom more than 40 minutes long, the chance for an individual recitation every day is very slight."[13]

While there is not complete agreement among the authors quoted, the reader will note that, for the most part, writers in the field of education have been of the opinion that elementary classes should contain not over 35 or 40 pupils, and high-school classes not over 25 or 30. A questionnaire on ideal class size sent by Dr. P. R. Stevenson to 270 city superintendents of schools in cities of 25,000 population or over resulted in the following estimates:[14]

TABLE I

IDEAL CLASS SIZE AS ESTIMATED BY 270 SUPERINTENDENTS OF SCHOOLS

	Median
Grades 1 to 3	32
Grades 4 to 6	33
Grades 7 to 9	31
Grades 10 to 12	26

[11] Felter, W. L. "The Size of Classes." *Educational Review*, XLI, (April, 1911), pp. 418-420.

[12] Merill, Alice L. "Classroom Enrollment." *Sierra Educational News*, XIV, (June, 1918), pp. 342-343.

[13] Report of Committee, New York Teachers of Modern Language: "A Study of the Modern Language Situation and Recommendations Pertinent Thereto." *Bulletin of High Points*, New York City Schools, June 1921.

[14] Stevenson, P. R. *Smaller Classes or Larger.* (Bloomington, Illinois: Public School Publishing Company, 1923), 127 pp.

Dr. J. C. Almack asked 1,088 teachers for similar estimates, obtaining an estimated ideal class size for all grades of 36.[15]

The 1929 Yearbook of the Department of Superintendence says that when city superintendents were asked: "'What is the ideal class size for beginning first-grade classes when homogeneous grouping is used?' they replied that the median number reported for 20 school systems was 27, with a range from 20 in the slow group to 35 in the superior groups. Where homogeneous grouping was not in effect, 25 was the median number named as an ideal class size. In 17 school systems reporting, 35 was the median given as the standard class size."[16]

Studies of the actual size of classes have indicated at least until recent years, that they deviate markedly from the estimated ideal class sizes mentioned above. In 1915 a report of the North Central Association of High Schools and Colleges showed that even among member high-school classes averaged well above 35.[17] The Boston School Committee in 1910 apportioned one teacher to 44 pupils, and prepared tables prescribing the number of teachers per building and per grade in accordance with the enrollment.[18] Kindergarten and ungraded classes in Boston were then smaller than 44, but many regular classes were considerably larger, many of them approaching 60. Data similar to those just given might be quoted at length.[19, 20] More recent reports on actual class size show a closer approximation to the class sizes mentioned as ideal by educators. In 1921-22 the American City Bureau Report stated that the median class sizes for 429 cities reporting were:[21]

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[15] Almack, John C. "Class Size and Efficiency." *Journal of the National Education Association*, XII, (1923), pp. 107-109.

Also in "The Adaptation of the School Building to a Program of Educational Efficiency," Ph. D. Thesis, Stanford University, 1922, pp. 31-41.

[16] Department of Superintendence of the National Education Association, *Seventh Yearbook*, (1929), p. 41.

[17] "Size of Classes: A Study of the Colleges and High Schools in the North Central Association." *United States Bureau of Education Bulletin*, 1915, No. 6, pp. 47-53.

[18] Boston School Committee. "Number of Pupils to a Teacher." *Rules of the School Committee and Regulations of the Public Schools*, School Document No. 11, 1910, pp. 72-77.

[19] St. Louis Board of Education. "Average Membership to Each Teacher." *Sixty-First Annual Report for the Year Ending June 30, 1915*, St. Louis, Missouri, pp. 360-363.

[20] "Statistics of City School Systems, 1917-18." *United States Bureau of Education Bulletin*, 1920, No. 24. (Data from 80 school systems, for over 1,000,000 children).

[21] See footnote 10.

TABLE II

MEDIAN ACTUAL CLASS SIZE IN 429 CITIES

	Median
Kindergarten	37
Elementary Grades	38
Junior High School	28
Senior High School	25

The 1922 *Research Department Bulletin* of the National Education Association reported data relative to class size as follows:[22]

TABLE III

MEDIAN CLASS SIZE IN CITIES REPORTING

	Median
Elementary Grades	
Cities over 100,000	38
Cities from 25,000 to 100,000	35
Cities under 25,000	36
Junior High School	
Cities from 25,000 to 100,000	30
Cities under 25,000	34
Senior High School	
Cities over 100,000	25
Cities from 25,000 to 100,000	27
Cities under 25,000	25

The data presented in Tables II and III indicate that, at least in cities, classes in American public schools tend, in recent years, to approximate the sizes estimated as ideal by teachers and administrators.

Some of the earliest investigations of the influence of class size upon instructional efficiency attempted to discover the effect of class size upon promotion rates. In 1909, Oliver P. Cornman reported data from 300 classes in 20 schools in Philadelphia.[23] He found the largest promotion rates in classes from 40 to 50 pupils. Classes of fewer than 40 pupils were poorer, judged by promotion rates, than those of over 50 pupils, except in the primary grades. The medium-sized classes, with 40 to 50 pupils, were also judged best in conduct as measured by teachers' estimates.

Philip A. Boyer's 1913 study of promotion rate as affected by class size was also conducted in the Philadelphia schools.[24] He found no consistent differences between the promotion rates from large and small classes.

A study of pupil progress in New York City, reported by Frank W. Bachman in 1913, showed that there was only one more promotion per

[22] "Facts on the Cost of Public Education and What They Mean." *Bulletin, National Education Association Research Department*, 1922, No. 1, p. 54.

[23] Cornman, Oliver P. "Size of Classes and School Progress." *Psychological Clinic*, III, (December 12, 1909), pp. 206-212.

[24] Boyer, Philip A. "Class Size and School Progress." *Psychological Clinic*, VIII, (May, 1914), pp. 82-90.

94 pupils in classes of 50 and under than in classes of more than 50 pupils.[25]

In 1915, Dr. C. L. Harlan made a more extensive investigation of the influence of class size upon school efficiency, studying six factors besides promotion rate.[26] He was concerned with promotion rate, percentage of withdrawals from class, scores on Courtis arithmetic tests, the percentage of pupils not giving attention to the recitation (based, as are the items which follow, on estimates from observations during 76 visits to 30 classes in two city systems), the percentage of the class not participating in the work of the recitation, the amount of time spent in the routine activities of the schoolroom, and the percentage of time wasted by the class during study periods.

Dr. Harlan concluded (on the basis of questionnaire data from 348 classes) that small classes tended to increase promotion rates slightly. On the basis of data from the same cities, he stated that large classes are accompanied by a greater percentage of withdrawals from school than are small classes. The Courtis arithmetic test scores from 675 classes in 32 cities were slightly higher in classes from 31 to 55 pupils (which he calls medium-sized classes) than in larger or smaller classes. On the other items studied, according to Dr. Harlan, there were no observable differences except that small classes seemed to waste more time than large ones. He considered his conclusions tentative, and recommended better supervision of large classes rather than reduction in size. Later (in 1926) he recommended the development of techniques especially suited to large classes.[27]

Dr. Harlan's 1915 report has been criticized by Eugene Smith on the following counts:[28]

1. Intelligence differences were not considered as a possible factor influencing the differences reported.

2. Policies of the various city school systems with respect to class size were disregarded.

3. Withdrawals were not taken into consideration in the analysis of promotion rates and test data.

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[25] Bachman, Frank W. "Final Report of the Committee on School Inquiry." New York City, 1911-13, pp. 606-609.

[26] Harlan, C. L. "Size of Class as a Factor in Schoolroom Efficiency." *Educational Administration and Supervision*, I, (March, 1915), pp. 195-209.

[27] Harlan, C. L. "Size of Class and Types of Instruction." *Journal of Educational Research*, XIV, (Sept., 1926), pp. 120-125.

[28] Smith, Eugene. "Size of Class as a Factor in Schoolroom Efficiency—A Reply." *Educational Administration and Supervision*, I, (June, 1915), pp. 384-389.

4. No account was taken of the size of the classes of which the pupils had been members during previous years.

5. There was no control on whether or not the classes were equally well taught.

6. Several of Harlan's conclusions were based upon very small numbers of classes.

In the light of our present information concerning individual differences, valid conclusions as to the relative efficiency of large and small classes cannot be based upon such data as have been summarized above. That this view is rather general is shown by a statement in the 1929 Yearbook of the Department of Superintendence of the National Education Association, to the effect that most superintendents are of the opinion that factors other than class size tend to influence promotion rates.[29]

Even before modern standardized tests had been developed, there had been some attempt to evaluate class size as a factor in pupil achievement by the use of uniform examinations. Dr. J. M. Rice in 1903 gave examinations in arithmetic and language to 6,000 school children (in seven cities, grades four to eight) in an effort to study the factors influencing pupil achievement.[30] Class size was one of the factors he considered in connection with the arithmetic test. He concluded that class size had no influence on the scores of this test, for "the number of pupils per class was higher in the highest six schools than it was in the schools in City VI (next to the lowest in average achievement), and the classes were exceptionally small in the school that stands at the lowest end."

The study reported by Dr. Harlan in 1915 was the first to make use of standardized tests. Results from the Courtis arithmetic test scores for pupils from 675 classes led him to the conclusion that children in medium-sized classes (31 to 55 pupils) made slightly higher scores than children in larger or smaller classes.

The study of variations in pupil achievement reported by Dr. C. H. Elliott in 1915 dealt with class size as one possible factor affecting teaching efficiency.[31] One section of his study, based upon records for 10,000 pupils from a city in New York and one in Massachusetts, dealt with

[29] "Size of Class." Department of Superintendence, National Education Association, *Seventh Yearbook*, (1929), p. 60.

[30] Rice, J. M. "Educational Research: A Test in Arithmetic." *The Forum*, XXXIV, (1902), pp. 280-297.

[31] Elliott, C. H. *Variations in the Achievement of Pupils.* Teachers College Contributions to Education, No. 72 (1914), 114 pp.

promotion rate. With respect to this he concluded: "So far as these cities are concerned, there is practically no relationship between class size and promotion rate." He gave a series of objective and standardized tests to an experimental group of 1,720 fifth- and seventh-grade pupils, members of 40 classes in 14 schools in New York, New Jersey, and two or three New England states. The tests used included the Buckingham Spelling, Thorndike Handwriting, a composition test based on the Hillegas scale, an original test of vocabulary range, and the Courtis arithmetic tests. The teachers of the 40 classes studied were rated on teaching efficiency by their supervisors. The school records and test data available were analyzed with reference to the influence of age, sex, time allotments to school subjects, size of class during the current year, size of class in which each pupil was enrolled during the preceding four years, etc. Dr. Elliott concluded with respect to this part of the study that "The findings of this study yield no correlation with size of group for results taken in a single year." Over a four-year period, however, pupils in large classes made lower average scores than did pupils in medium-sized and small classes.

The first published experimental study on the relation between class size and pupil accomplishment which was carried on for a definite period of time was that reported by F. S. Breed and Miss Grace D. McCarthy in 1916.[32] This was planned by the Southeastern Michigan Superintendents' round table, and carried out in the Michigan schools. The subject chosen was spelling, in grades three to seven. A spelling test was given at the beginning of the experiment, then 20 days of carefully planned drill on certain words followed, and finally another test was given. Thirty-two superintendents of schools, with 82 classes, participated in the experiment. From these 82 classes it was possible to obtain 29 pairs of large and small classes, each pair of the same school grade. The factors which were kept constant were: time for study and recitation, number of words studied, the order in which the words were studied, the method of teaching, dates for preliminary and final tests, and the person giving both tests in each particular class. On the final tests, the large classes (with an average enrollment of 45) surpassed the small classes (with an average enrollment of 27) in four of the five grades. The smaller classes surpassed the larger ones in the seventh grade. The correlation between the size of the class and the amount

[32] Breed, Frederick S., and McCarthy, Grace D. "Size of Class and Efficiency of Teaching." *School and Society*, IV, (December 23, 1916), pp. 965-971.

of improvement in spelling was +.07 for these 29 pairs. When data from 40 classes with enrollments from 20 to 45 were used, the correlation was +.28 ±.098. The writers recommended classes of about 45 in spelling. Their conclusions are especially open to criticism on the ground that there were too few classes at each grade to justify more than tentative conclusions.

In 1918 a committee of the California Education Association, whose chairman was Miss Alice L. Merill, reported that checking arithmetic test scores (kind of test not stated) for large, medium, and small classes gave no conclusive results as to the influence of class size.[33] She presented no data.

One section of Dr. J. C. Almack's study of the adaptation of the school building to a program of educational efficiency was an experimental study of class size.[34] Three grades participated in this experiment. A 5B class of 20 pupils was paired for mental age and taught in two sections of 10 each during the winter quarter, and again united during the spring quarter. A class of 5A pupils, 30 in number, was united during the winter, but taught in two groups during the spring. A 7B class with one section of 35, and one of 11 pupils, was kept constant during the two quarters. The Monroe Silent Reading Tests were given to all the above groups, the Monroe Revised Diagnostic Arithmetic Tests to the fifth-grade groups, and the Woody-McCall Arithmetic Tests to the seventh-grade groups, at the beginning, middle and end of the experiment. These were all training-school pupils, taught by student cadets, who were told to "teach as much as possible." Although a slightly higher percentage of the pupils showed greater gains in large than in small classes, the differences, according to Dr. Almack, were so small as to be ambiguous in the light of the experimental conditions. He concluded that "class size is not an important factor in determining efficiency in teaching as measured by these standard tests." Although comparable on the basis of mental age, the groups he used were not equated for initial achievement, excellence of teaching, etc.

While at the University of Illinois, Dr. P. R. Stevenson carried out, under the direction of Dr. B. R. Buckingham, a study of the relative efficiency of large and small classes, using the Chicago schools in 1920-21. Two preliminary reports on this study were made by Dr. Walter R.

[33] See footnote 12.
[34] See footnote 15.

Monroe in 1922,[35] and a more detailed one by Dr. Stevenson in 1923.[36] A preliminary survey (through questionnaires) in Illinois indicated that the solutions most desired by schoolmen in that state had to do with classes from 25 to 35 pupils versus classes from 40 to 45 pupils in the grades, and in high schools, with classes from 20 to 30 versus those from 25 to 35 pupils. The Chicago study was planned according to this point of view.

In the Chicago experiment, grades two, five and seven were used, some from both A and B sections. They were distributed as follows:

Second grade: 11 classes; 3 small first semester, 8 small second semester.

Fifth grade: 13 classes; 3 small first semester, 10 small second semester.

Seventh grade: 5 classes; 3 small first semester, 2 small second semester.

In size the range was as follows:

Grade	Small Classes	Large Classes
Second	33 to 44 pupils	45 to 54 pupils
Fifth	33 to 45 pupils	42 to 52 pupils
Seventh	35 to 44 pupils	42 to 49 pupils

It will be noted that some of the "small" classes were larger than some of the "large" classes.

Several standard tests were used with these classes. The Dearborn Group Intelligence Test, the Pressey Primer Scale, and the Indiana Scale of Attainment No. 1 were used in the second grade, and the Illinois General Intelligence Scale, the Charters Diagnostic Language Test, and 20 words from columns N and R of the Buckingham Extension of the Ayres Spelling Scale were given to grades five and seven. Form I of each test was given in October and May, and Form II in January. The tests were administered and scored by the teachers.

T-scores were used by Dr. Stevenson to compare the large and small classes on these tests. He used the scores of pupils who were in a large class one semester, and in a small class the other semester. It was intended that the range and variability of scores on the intelligence test should be approximately the same for both large and small classes—

[35] Monroe, Walter R. "Relation of Sectioning a Class to the Effectiveness of Instruction." *University of Illinois Bulletin*, XX, (Nov. 13, 1922). 18 pp.

[36] Stevenson, P. R. *Smaller Classes or Larger.* (Bloomington, Illinois: Public School Publishing Co., 1923), 127 pp.

this plan was used to obviate the necessity of pairing. Dr. Stevenson concluded that with the tests used, no consistent differences between pupil progress in large and in small classes were discoverable. School marks and class size, when compared for certain Chicago high schools, showed no definite relationships. Dr. Stevenson considered the study as only preliminary, partly because of the large number of experimental conditions which were not controlled.

One of the most extensive studies of the relation between class size and pupil accomplishment yet made is that reported in 1923 by C. O. Davis.[37] It was conducted in 1922 in about 100 high schools which were members of the North Central Association. A study of teachers' marks and class size in these 100 schools revealed no consistent general tendencies. There seemed to be some differences in certain school subjects, but the data were not considered sufficiently accurate for detailed analysis. Experimental classes were, therefore, planned and carried out for nine weeks. There were 65 "small" classes (less than 20 pupils each), 120 "medium-sized" classes (20 to 30 pupils), and 55 "large" classes (from 30 to 50 pupils), including in all 6,130 pupils in 20 high schools. The intelligence and achievement of these pupils are said to have been comparable, though no data on this point are given. It was concluded that size of class had no important effects on school marks. Pupils in small classes in English made higher marks than those in medium-sized or large classes; those in large classes in social science and mathematics excelled those in small and medium-sized classes; and those in medium-sized classes in modern language made higher grades than those in small and large classes. As the number of classes in these subjects are not mentioned, one cannot judge the reliability of these differences from the report.

Mr. R. E. Tope, Miss Emma Groom, and Marvin F. Beeson reported on a further extension of the North Central Association experiment carried on in the high school at Grand Junction, Colorado.[38] In that high school there were three classes in third-year English, all taught by the same teacher, which were kept intact during the entire year. The "large" class contained 44 pupils, the "medium-sized" one 34, and

[37] Davis, C. O. "The Size of Classes and the Teaching Load in the High Schools Accredited by the North Central Association." *School Review*, XXXI, (June, 1923), pp. 412-429.

[38] Tope, R. E., Groom, Emma, and Beeson, Marvin F. "Size of Class and School Efficiency." *Journal of Educational Research*, IX, (February, 1924), pp. 126-132.

the "small" one 20. The class medians on the Terman Group Test were practically identical. The teacher attempted to use the same methods for all three classes, and covered the usual curriculum. Four types of measures were used for comparing the progress of the pupils:

1. A group of tests intended to test grammar information (instruction in grammar took up one sixth of the year): the Kibbey Grammar Test, the Starch Grammar Test, a special test on clauses, the Monroe Silent Reading Test, and the Carr Vocabulary Test.
2. Notebooks and objective examinations in American Literature.
3. Oral and written reports on outside reading.
4. Periodic and final grades.

At the end of the experimental period the small class was found to have a slight advantage in grammar, and in parts of American literature which emphasized drill and memory. The large class excelled in phases of American literature which were emphasized in class discussion. There were no observable differences between classes with respect to outside reading. In the matter of periodic and final grades, the average marks of the pupils in the small and medium-sized classes were slightly higher than those of pupils in the large class. No effort was made by the authors to determine the statistical significance of any of these differences, and no conclusions were drawn. The writers stated that sex differences were not controlled, that repeaters were not eliminated, and that in their opinion, English does not lend itself well to such an experiment. It should be noted that the authors made no attempt to measure progress by repeated administrations of the same subject-matter tests.

While a member of the staff of the Bureau of Educational Research of Ohio State University, Dr. P. R. Stevenson carried out in 1923-24 in four Ohio cities (Akron, Cincinnati, Cleveland, and Toledo) a study similar to the one he had directed in Chicago.[39] Pupils from grades two, five, and seven were used. The tests used as measures of intelligence and achievement were the same as before, with the exceptions that the Pressey Second Grade Achievement Scale was used instead of the Pressey Primer Scale for the second grade, and that the Charters Language Test, Stevenson Problem Analysis Test, the Buckingham Scale for Problems in Arithmetic, and the Buckingham Extension of the Ayres

[39] Stevenson, P. R. *Class Size in the Elementary School.* Bureau of Educational Research Monographs, II, No. 10, Ohio State University Studies, (November 30, 1925), 35 pages.

Spelling Scale were added to the battery of tests given the pupils of the fifth and seventh grades. Each pupil spent one semester in a large class, the other semester in a small class. A system of rotation was used, so that the effects of greater progress during the first semester could be allowed for (i.e., there were as many small classes the second semester as the first). While members of the classes equalled several thousand pupils, test results for only those who had taken all the tests were used in the comparisons of progress in large and small classes. The scores of these 1,129 pupils were rendered comparable by the T-score method, and comparisons of gains in the various school subjects were made by grade, and by a grouping into three intelligence groups within each grade. Dr. Stevenson also attempted to find at what point diminishing returns began as the class size increased. He concluded on the basis of the test scores that second-grade pupils made better progress in classes of less than 45, and that fifth- and seventh-grade pupils make better progress in slightly larger classes. Dull pupils of all three grades progressed more rapidly in large classes; with the bright and average pupils there were slight differences from subject to subject and from grade to grade.

The only published study of class size with relation to teaching efficiency which concerns itself with children grouped homogeneously for intelligence is that reported by Miss Alice B. Metzner and Charles S. Berry in 1926.[40] Four experimental groups and one control group of mentally retarded pupils under 13½ years of age, in the Detroit public schools, were tested at the beginning and end of a 180 half-day experimental period. The tests used were the Pressey First-Grade Reading Test, the Stanford Achievement Test, the Ayres Handwriting Scale, and a Test of Motor Control. Each of the four experimental groups contained three classes. One of these groups contained 15 pupils per class, another 20, another 25, and another 30. The control group consisted of 12 classes with 22 pupils in each class (the regular size of classes for mentally retarded pupils in Detroit). It was hoped that this experiment would determine the optimum size for these classes. The pupils were stated to have been comparable with respect to mental age, IQ, and group intelligence test score. Their teachers were comparable with respect to teaching ability, as judged by their principals and supervisors. It was also stated that the only significant differences

[40] Metzner, Alice B., and Berry, Charles Scott. "Size of Class for Mentally Retarded Children." *Training School Bulletin*, XXIII, (October, 1926), pp. 241-251.

in test scores at the end of the experiment were found in classes of 30 pupils, who made a much poorer showing on the Pressey First-Grade Reading Test than did the smaller classes. On the average, pupils in classes of 25 made as much progress as did those in classes of 15, 20, or 22, according to the tests used.

Three studies of class size as related to pupil accomplishment in university studies have been reported in the past five years. Experimentation at the University of Michigan, reported by Dr. J. B. Edmondson and F. J. Mulder in 1924, was carried on with a large and a small class in "An Introduction to High-School Problems."[41] The large class of 97 students, and the small class of 43 students, were taught by the same instructor, who attempted to use the same teaching procedures in the two classes the 43 students in the small class were paired with the same number from the large class, on the basis of scores taken from the scrambled Army Alpha, on whether or not the student had taken an intelligence test before, and on whether or not he had taken the Alpha before. Sex as a possible factor was not controlled—it was stated that most of the students were women. The large class met at one P.M., and the small one at two P.M. Comparisons were made for the 43 pairs of students on semester marks, essays, quizzes, and mid-semester marks by the same assistant. Averages, ranges, and quartiles were practically identical for the two classes, any possible slight advantage being with the large class. The significances of the differences found were not statistically determined by the authors. At the end of the experiment, by a slender margin, student opinion favored small classes. Five students who transferred from the large to the small class during the last four weeks reported that they found many differences in methods of teaching and in class response. Questions raised by the authors as a result of the study included: (1) Are marks adequate measures of achievement in such experiments? (2) When a teacher has an assistant to mark papers, is the teaching load considerably increased when the class size is raised from 45 to 100? No conclusions were drawn.

Dr. Earl Hudelson in 1926 made a preliminary report on experimentation relative to the influence of class size upon teaching efficiency which is now under way at the University of Minnesota.[42] A sub-

[41] Edmondson, J. B., and Mulder, F. J. "Size of Class as a Factor in University Instruction." *Journal of Educational Research*, IX, (January, 1924), pp. 1-12.

[42] Hudelson, Earl. "Class Size in Universities." *Educational Review*, LXXII, (November, 1926), pp. 231-234.

committee of the faculty is acting in an advisory capacity, helping any department or instructor to plan desired experimentation along this line. At the time of the report, the departments of anatomy, law, and education were carrying on such experiments. Large classes ranged from 60 to 250 in size, while small ones were less than 30 pupils. The same subject matter and teaching methods were being used in both types of classes; members of the small classes were paired with members of the large class in each case, and the same instructor taught both classes. Frequent objective examinations were given to both classes. At the time of Dr. Hudelson's preliminary report exact data were not yet ready for presentation. He stated, however, that so far as it was possible to measure student achievement, class size had little or no effect upon it. Another reference to this experimental work states that experimental classes were being carried on in English and Mathematics in the University High School, but no published report is as yet available.

The most recently reported study of class size as affecting teaching efficiency in the university is that by B. F. Holland.[43] The 492 students who registered for Educational Psychology at the University of Texas for the first semester of 1927-28 were taught for 24 fifty-four minute periods in eight classes of various sizes by two instructors. The eight classes were given the same tests and final examinations, which were of the true-false type. The principal results of the study are presented in Table IV, which follows:

TABLE IV

COMPARISON OF UNIVERSITY OF TEXAS STUDENTS IN EDUCATIONAL PSYCHOLOGY

Class	No. in Class	Mean on comb. Score on 7 tests	Mean on final exam.	Range on final exam.	Mean on U. of Texas Intell. Test
Group A (Instructor A)					
I	83	86.9	68.3	41-86	38.00
III	63	88.5	66.9	33-89	38.33
V	61	92.2	71.8	51-86	40.00
VII	34	91.2	65.9	33-84	32.20
Group B (Instructor B)					
II	112	85.4	65.8	34-92	38.00
IV	71	89.2	67.9	30-91	41.03
VI	42	90.9	70.8	41-92	45.28
VIII	26	89.1	68.9	36-88	44.62

The figures in the last column are the mean scores on the University of Texas intelligence examination, which is reported to have a reliability of .83, and to correlate +.48 with university end-semester marks. No

[43] Holland, B. F. "Effect of Class Size on Scholastic Achievement in Educational Psychology." *School and Society*, XXVII, (June, 1928), pp. 668-670.

pairing of groups or of individuals, or other method of control, was attempted in connection with this study. The author concluded that differences in intelligence probably account for observable differences in test and examination scores.

The latest published study of the relationship between class size and pupil accomplishment was made by Daniel A. Bates in a Montreal school.[44] He studied the marks for 94 classes made on city examinations and taught by 21 teachers. He divided the 94 classes into three groups on the basis of size. The small classes averaged 21.7 pupils, the medium-sized ones 30.7 pupils, and the large classes 40.1 pupils. His observations were that both teachers and pupils were more alert in the large classes. He reported that the teachers developed different techniques for the three types of classes, especially in the case of written work. He observed that 8.3 percent of the pupils in small classes, 9.2 percent in medium-sized classes, and 5.8 percent in large classes, were inattentive. There were, of course, differences in the ability of teachers to obtain and hold attention, but each teacher had classes in at least two different sized groups. According to Mr. Bates, pupils were found to be more interested and to show better habits of work in large classes.

On the city arithmetic examinations, Bates found marked superiority of the large over the medium-sized classes and of the medium-sized over the small classes. These differences were not apparent with the other subjects. The following table presents average marks in arithmetic as compared with those for all subjects combined:

TABLE V

AVERAGE MARKS OF CHILDREN IN A MONTREAL SCHOOL

Size of Class	Av. Mark in Arithmetic	Av. Mark in all Subjects
Small	65.1	73.9
Medium	67.4	74.0
Large	71.9	74.5

The correlation between the number of pupils per class and average marks was, for arithmetic, $+.495 \pm .05$, and for all subjects combined, $+.148 \pm .05$. Bates stated, however, that examination of the records indicated that in determining such marks class size was much less important than pupil intelligence.

[44] Bates, Daniel Abel. "The Relation of the Size of Class to the Efficiency of Teaching." *M. A. Thesis*, University of Chicago, August, 1928. Reviewed in *Bulletin of the Department of Secondary School Principals of the National Education Association*, No. 24, (January, 1929), pp. 22-23.

Under the supervision of the consultative committee of the Secondary School Principals of the National Education Association, several experiments using large and small classes are now under way in various parts of the country.[45] Some of these are reported to be rather informal in type, while others have attempted to control conditions rather rigidly. The only report which has appeared to date presented mostly the reactions of teachers, principals, and pupils to large and small classes. One experiment with classes in Geometry seemed to indicate that definite points "got over" better in small groups, but final achievement in Geometry, as measured at the time of the report, was very much the same for the large and the small groups. It is expected that full reports of many of these experiments will eventually be published.

CONCLUSION

The possibility of practical relationship between class size and pupil accomplishment is probably responsible for most researches on the problem. So much public money is being spent annually for school buildings and instruction that boards of education and superintendents of schools are asking how many pupils may be safely given to each teacher without materially decreasing pupil accomplishment. Dr. P. R. Stevenson has estimated that in a city the size of Chicago stupendous sums could be saved every year if the average enrollment per teacher could be increased by only one pupil.[46] The results of the studies which have just been summarized may be conservatively interpreted as follows:

Early studies of the relationship between class size and pupil accomplishment, which used promotion rate as the criterion, seemed to show a very slight advantage of small and medium-sized classes as compared with large ones. As has been said, however, so many factors were entirely uncontrolled in these studies that it would be unwise to weight their findings heavily.

More recent studies made in the elementary grades, using standardized tests as measures of pupil accomplishment, have presented somewhat conflicting conclusions. When the procedures followed, tests used, factors controlled, etc., are analyzed, it seems safe to conclude that in the elementary grades pupils in classes from 45 to 50 or 55 pupils make as high test scores as those in smaller classes.

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[45] "Report of the Consultative Committee." *Bulletin of the Department of Secondary School Principals of the National Education Association*, No. 25, (March, 1929), pp. 49-61.

[46] See footnote 1.

The three studies of university class size and efficiency of teaching which have been published show no differences that may be attributed to numbers in school marks or scores on objective examinations. Large classes in the university tend, of course, to be larger than any classes in the elementary grades or secondary schools in this country.

Only one extensive investigation of this subject as related to high schools has been reported. The North Central Association experiment, uncritically judged, might lead to the conclusion that, on the basis of school marks, in English, pupils progress best in classes of 20 or under; in modern language, from 20 to 30; and in social science and mathematics over 30. In a similar study, Stevenson found no consistent tendencies in the Chicago high schools. No published report of the experimentation at University High School, Minneapolis, has been available.

Criticisms which may legitimately be made of the majority of the reported studies include: failure to control such factors as sex, possible diurnal changes, presence of repeaters in experimental groups, size of room, race differences with consequent language handicap, and initial accomplishment. Some of the tests used have low reliabilities and inadequate testing range for the groups with which they were used; no attempt has been made to determine statistically the significance of reported differences; etc. The experiments which are now being carried on under the auspices of the Department of Secondary School Principals include several studies which have attempted to control conditions more rigidly. The study reported in the second section of this paper was undertaken as a unit of this program, and deals with the relation between class size and pupil accomplishment in second semester high-school algebra.

EDITORIALS

A BACKGROUND FOR RESEARCH

After one lecture on how to do experimental research, one of the younger members of the faculty of a well-known university, when asked to cite further material dealing with the subject of his lecture, replied that he had been forced to rely largely upon his imagination and experience and that there were no references to refer to. One is reminded by this incident of the story of one of Thorndike's students who assured the professor that he knew that his work was original because he had been careful to read nothing written on the subject.

The literature of experimental research as we all know, is a rich one and as old as science itself. Since Bacon, there has lived a long line of eminent scholars who have contributed to methods of research: Descartes, Locke, Hume, Mill, Huxley, Whewell, Jevons, Herschel, Pearson, Bain, Venn, and others. Logic means to the average mind syllogisms and formalism. Regardless of what may have been said of the subject fifty years ago, all who keep step with scientific reasoning know that it has changed and that no research worker can afford to be ignorant of the literature of modern logic and do research. We find in modern logic thorough discussions of such topics as: the nature of science; induction; the steps in inductive reasoning; methods of observation and experimentation; definitions; methods of measurement; control of factors and variables; cause and effect; hypotheses; the determination of causal relations; plurality of causes and the intermixture of effects; methods of analysis and classification; the statistical treatment of data; probability; the nature of proof; verification; generalization, analogy, and classification; scientific explanation; induction fallacies; the scientific law, etc. Some of the standard textbooks of this subject are those by Creighton, Fowler, Minto, Welton, Sidgwick, Westaway, Robinson, Wolf, McClure, and Burtt.

The situation in statistics is very similar to that in methods of research. But we have research workers to whom statistics mean Rugg,

Holzinger, and Kelley. Of those who push on further, many know too little about the mathematical background of statistics: probability,—its principles and philsophical aspects; the laws of large and small numbers; Bernoullian, Poisson, and Lexis series; frequency curves, methods of integration; curve fitting; partial and multiple correlations; the theory of sampling, the sampling of attributes, the sampling of variables, etc. The standard works on this subject, such as those by Edgeworth, Pearson, Yule, Charlier, Czuber, and Laplace; and text-books, such as those by Whittaker and Robinson, Reitz, Fisher, Yule, Jones, Chaddock, and Bowley; together with the mathematical aids, such as Glover's *Tables*, Running's *Empirical Formulas*, Lipka's *Graphical and Mechanical Computation*, Peirce's *Table of Integrals* and Pearson's *Tables for Statisticians and Biometricians* give, when mastered, at least a feeling of power. Mathematics bears about the same relation to statistics that logic bears to the methodology of research.

The foreign literature of education contains much that is valuable for the American research worker. Among the magazines, one will find the following useful sources of information: in German, *Archiv für die gesamte Psychologie* (Leipzig), *Internationale Zeitschrift für Individualpsychologie* (Wien, Austria), *Internationale Zeitschrift für Psychoanalyse* (Leipzig), *Zeitschrift für Psychologie* (Frankfurt), *Zeitschrift für Pädagogische Psychologie and experimentelle Pädagogik* (Leipzig), and *Zeitschrift für angewandte Psychlogie* (Leipzig); in French, *Archives de psychologie* (Geneva), *Bulletin de la Société Alfred Binet* (Paris), *L'Année Psychologique* (Paris), and *Revue de philosophie* (Paris); in Spanish, *Revista de pedagogia* (Madrid), and *Revista de Educacion* (Chile); and in Italian, *Archivo italiano di psicologia* (Torina). There are, besides these continuing publications, numerous books, pamphlets, and bulletins dealing with statistics, logic, and the scientific method which should prove helpful to the American research worker. The *L'Année Psychologique*, published annually, contains a useful digest of the experimental literature of all countries and of all languages.

Besides these sources of materials, there is, of course, a well developed literature of research in the field of education itself. The best known treatments of this subject are Trow's *Scientific Method in Education*, McCall's *How to Experiment*, Kelley's *Scientific Method*, and Good's *How to do Research*. The last contains a well annotated bibliography of

the American sources of research materials. There is also much valuable material in the allied fields of psychology, biology, and sociology and in the lives and works of a long line of eminent scientists in these fields. The literature of experimental research is rich in content and authorship. While the average research worker can scarcely be expected to familiarize himself with any considerable portion of this literature, it is useful to know that such a literature exists. It would seem, however, that any one responsible for the direction of research and for the formulation of research policies can hardly be excused from knowing something of this larger field of research literature.

A. S. B.

REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

ALEXANDER, THOMAS. *The Training of Elementary Teachers in Germany.* New York: Bureau of Publications, Teachers College, Columbia University, 1929. 340 pp.

It may seem to some a great waste of labor to produce so large a volume as this descriptive of systems of teacher training which are avowedly experimental and hence more or less in a process of abnormally rapid change. Not only is it true, as the author says in his opening sentence, that "The present volume will in many details be out of date before many years pass" but the changes occurring are so swift and continuous that, as he states toward the close of the volume, "Many of the facts incorporated in this text will be out of date before the book is published, because of the rapid changes which are taking place."

Yet the study of educational systems during a period of conscious adjustment to changed conditions is in certain respects likely to prove more profitable than the study of relatively static systems. This is particularly true when the adaptation is to a more democratic and fluid organization of society. Moreover, when a people, who have exerted so wide and profound an influence on educational thought and practice as have the Germans, undertake a deliberate and thorough renovation of their educational institutions and procedures, the process is likely to repay even a somewhat detailed examination. Dr. Alexander's book tends to confirm this opinion.

In his introductory chapter he points out that "Three times in the last two hundred years Prussia has met with disastrous and apparently overwhelming defeat," and that in the two former instances her extraordinary recovery and rise to greater power than before has been accompanied by an upward lift in her educational system. We are now witnessing, perhaps, a third like sequence of events.

Certain features of the new systems of teacher training are of unusual significance. For instance, there is a more definite recognition of the teacher as not merely the educator of the young but as the professional expert in all that pertains to the intellectual and moral development of both young and adult. It is recognized further that for the adequate performance of these duties the elementary teacher will need a protracted training in a professional school with standards comparable to those of schools of law and medicine and, like them, of university rank.

Another feature of the various plans for the more efficient training of the teacher is the attention paid to the development in the prospective teacher of a personality as contributory as possible to successful professional achievement.

The book is well planned. The introductory chapter, above referred to, affords a birds-eye view of teacher training in Prussia from the eighteenth century to the present in its relation to changing political, social and economic conditions. The following chapter describes the system as it existed in Prussia at the time of the outbreak of the World War. Chapters III to VIII are devoted to descriptions of training systems as they exist to-day in the several states of Germany. Chapter IV, by far the longest in the book, presents a detailed but none the less interesting account of the important new, and more or less experimental, teachers colleges in Prussia. A critical survey of the collective systems is then made from the standpoint of the curriculum. Chapter X affords a like review of student teaching.

Notwithstanding the complex and protean character of the material with which he deals the author succeeds in leaving in the mind of the reader a definite and interesting picture of a great movement which bids fair to inaugurate a new era in the training of elementary teachers.

L. F. ANDERSON
Ohio State University.

GARRISON, S. C., and GARRISON, K. C. *The Psychology of Elementary School Subjects.* Richmond, Virginia: Johnson Publishing Company, 1929. xx + 569 pp.

This new book by two well-known educational psychologists is an admirable supplement to the existing texts in this field. Approximately forty-five percent of the space is devoted to the psychological foundations of method and measurement, and fifty-five percent to a discussion of the psychology of elementary school subjects.

To attempt to appraise any new book in education without knowing definitely for what situation it was intended is well nigh impossible. At this stage of the development of the science of educational psychology (and the psychology of elementary school subjects) no standardization of content and organization of subject matter is possible which might serve as a guide. In all probability such standardization would be inadvisable at this time. Moreover, there is great probability that learning and teaching can never be reduced to an exact science. Education as an art, will always have its place. Does a course in the psychology of elementary school subjects presuppose a course in the principles of educational psychology? If so, there will be a great amount of overlapping of topics since in this volume the authors discuss topics that are usually found in texts in educational psychology, such as Individual Differences, Measurements, Learning, Motivation, etc. Of course it might be argued that students do not master the principles of psychology as applied to learning and teaching on one exposure, that repetition of responses that are success bringing is essential to master, etc. Most teachers of educational psychology are in agreement on this point. Now, if a course in the principles of educational psychology presupposes a course in general psychology (and this is a requirement in many institutions), is there not danger of the student getting bored and disgusted by so much repetition, first in principles of educational psychology and again in the psychology of the elementary school subjects? If teachers colleges require a course in what is generally known as "Tests and Measurements" will not *The Psychology of Elementary School Subjects* as presented by our authors present still further duplication of time and energy since this work includes

chapters on measurement, statistical terms, measurement in reading, measuring results of instruction in arithmetic, etc.

While the teaching process is naturally dependent upon the learning process and the facts and principles of the two must be mastered and applied by the student of education to some extent simultaneously, attention should be called to the fact that *learning school subjects* deals with the response side of the educative process while teaching and measuring the outcomes of instruction belong to the situation side of the process. Naturally problems falling within the scope of measurement belong technically to the subject known generally as "Principles and Techniques of Teaching."

These remarks are not intended as adverse criticisms of the book under consideration. They aim merely to call attention once again to existing needs of a standard educational nomenclature, determination of what should be included in the professional education of teachers, analysis of the several courses in education and psychology with reference to the purposes to be served by these courses, and finally the preparation of textbooks for the several courses which will have a minimum of overlapping content and a maximum of interlocking and correlating principles. That this is being attempted by one of the publishers at the present time is an encouraging sign of progress.

The Psychology of Elementary School Subjects is written in easy, simple language that can be understood by first and second year students in normal schools and teachers colleges. Emphasis is upon the practical. Enough of historical settings is given to the various discussions to properly orient the student. The chapter on "The Psychology of the Teacher" impresses the reviewer as being one of the real contributions of the book. Although Professor Herman Harrel Horne called the attention of educators and psychologists to this neglected topic in a paper some years ago, very little has been written on this subject, notwithstanding the fact that physicians, psychiatrists and mental hygienists tell us that pupil fatigue, nervous ills, dislike of school, failure in school subjects, etc. are often due to the "personality of the teacher."

The reviewer feels that the authors could have given more space with propriety to such topics as misuse and limitations of standard tests, mental processes involved in learning school subjects, the psychology of error, psychology of success and failure, diagnostic testing and remedial teaching, classification of pupils according to abilities in school subjects, etc.

Owing to the existence of conflicting psychologies of learning and the fact that all children do not respond in the same way to school subjects, there is need of caution in the making of inferences and generalizations from results obtained from an experiment tried out on a few children. The authors have very wisely omitted the inclusion of results of experimental studies that are largely debatable.

CHARLES E. SKINNER
New York University

ROEMER, JOSEPH and ALLEN, CHARLES F. *Readings in Extra-Curricular Activities* and *Syllabus of a Course in Extra-Curricular Activities*. Richmond, Virginia: Johnson Publishing Company, 1929. xvi. + 844 pp.

A noticeably increasing amount of attention is being accorded the subject of extra-curricular activities by all groups

of educational workers who are especially interested in the secondary school. The first attempts at publication in this field took the form of magazine articles and reports of investigations of existing practices. Four years ago the first of a number of general textbooks appeared; the following year one of the yearbooks of a great scientific society was devoted to the subject, and since then several books have come out on sub-divisions of the field such as clubs and student government. This volume, which is another type of publication, will add greatly to the convenience with which the subject may be studied in institutions of higher learning.

Teachers of courses in extra-curricular activities for years have been embarrassed because of their inability to give their students access to a sufficient amount of the rich periodical literature in this field. Much of this material is to be found in publications which do not appear on the shelves of libraries in small institutions, and even in large institutions it has been impossible for teachers to refer classes of any great number to important articles of which only a small number of copies are available.

More than 800 pages with 127 references are distributed under 22 chapter headings. The first two chapters are assigned to philosophical considerations; three chapters are assigned to administrative problems, finances, and the dean of girls; four are concerned with the study hall, library, commencements, partis, and excursions; one chapter is devoted to scouting, and the remaining chapters are taken up with particular student organizations such as the home room, assembly, student government, clubs, savings bank, publications, musical organizations, etc. Much care has been taken to give enough of each article to convey effectively that part of its message which is desired. No material is included from textbooks as this is already easily accessible.

Perhaps every teacher will look in vain for some references and some topics that he would like to have had included in a volume of this nature. The authors have been guided in their selection, however, by a considerable amount of experience as teachers and practical workers in this field with the result that probably all teachers of the subject will be able to find in the volume much useful reading which hitherto they have not been able to place before their students. In view of this fact the volume will be welcomed as a valuable addition to the facilities of those who teach courses in this subject.

PAUL W. TERRY
University of Alabama

MORRIS, JOHN T. *Considerations in Establishing a Junior College.* New York: Teachers College, Columbia University, 1929. vi. + 63 pp.

The problem in which the study reported in this monograph appears to have originated was whether or not the University of Pittsburgh would be justified in establishing the freshman and sophomore years of its college work in Mt. Pleasant, Pennsylvania. This question had been raised by the trustees of a "Classical and Scientific Institute" in that community. As made, however, the study aimed to solve the larger problem of whether or not the University of Pittsburgh should establish one of its branches offering work of junior college grade in Southwestern Pennsylvania and, if so, where?

The method of proper location of junior colleges in this period of the

movement is timely, and the author has adduced a considerable body of evidence significant in demonstrating such a method. Among the kinds of pertinent information are data concerning population, school and college enrollment, distances and facilities of travel, and the like. It would be well if others contemplating the establishment of junior college work would make analogous inquiries in their communities. The study, however, does not canvass certain other important aspects of the problem as it is faced by those who are considering the establishment of public junior colleges, the type now gaining ground most rapidly. Among additional types of information highly desirable in such situations would be those pertaining to finance, adequacy of facilities in housing and equipment, and a more definite social description of the populace as a possible source of the student body. For the narrower problem with which the author was concerned, such evidence would have been interesting but not indispensable.

On account of the merit of the study one hesitates to mention certain defects in the form and composition of the report, defects that detract somewhat from its complete acceptability. The organization is not always as effective as it is desirable, as when the extent of illiteracy in the population is dealt with under the heading, "urban vs. rural population" (pp. 21-22). It is the feeling of the writer that the manuscript in many places would have been improved if the numerous tables had been given a larger accompaniment of explanation and interpretation. The meager treatment at some points effects a feeble articulation of textual with tabular matter. In some places one is annoyed by an inexcusable error in table reference, for example, the references to Table 7 on page 24, to Table 14 on page 29, and to Table 26-A on page 48. To a reader, not familiar with the location of colleges and universities in the state, the illegibility of names on the map of Pennsylvania on page 14 is disconcerting. Defects like these are, however, not enough to exclude the monograph from consideration in the rapidly increasing body of useful literature about the junior college.

LEONARD V. KOOS
University of Chicago

WICKMAN, E. K. *Children's Behavior and Teachers' Attitudes.* New York: Commonwealth Fund, 1928. v. + 247 pp.

This volume reports an attempt at the scientific study of teachers' attitudes toward children's behavior. It is a contribution in identifying the problem child, or what constitutes maladjustment. The author has collected material from a group of mental hygienists, and from teachers in Cleveland, Minneapolis, and many smaller cities scattered all over the United States.

Teachers were asked to list items of undesirable behavior. In all, 428 items were reported after eliminating duplications. There were 185 separate items of undesirable behavior (page 14). These items fall into seven large groups: (a) Violations of general standards of morality and integrity, such as stealing, immorality, profanity; (b) transgressions against authority, such as disobedience, defiance, impertinence; (c) violations of general school regulations, such as truancy or tardiness; (d) violations of classroom rules, such as disorderliness or whispering; (e) violations of school work requirements, such as inattention, carelessness, laziness; (f) difficulties with other children, such as cruelty, fighting, bullying, tattling; and (g) undesirable

personality traits, such as stubborness, selfishness, arrogance, temper tantrums.

Behavior problems are defined as conflicts between the child's behavior and social or individual demands for behavior.

From the viewpoint of the teachers, traits most undesirable are: (a) sex problems, stealing, dishonesty, truancy, disobedience; (b) problems of classroom order and application to school work; (c) antagonistic personality traits; and (d) withdrawing, recessive personality traits. The teacher's reaction to behavior is colored by the standards set up by society. The teacher is held responsible for bringing children up to a certain level of attainment. Whispering, disorder, etc., interfere with attaining that end.

The attitude of the 30 mental hygienists, who coöperated in this study, toward behavior problems is different from that of the teachers. While teachers stress the importance of the problems relating to sex, dishonesty, disobedience, disorderliness and failure to learn, mental hygienists consider the unsocial forms of behavior most serious and rather discount the stress which teachers lay on antisocial conduct. They hold that recidivism (page 130) is more serious than dishonesty, truancy, immoralities, or transgression against authority. The teachers consider most serious the behaviorisms of attack, whereas the mental hygienists consider most serious the behaviorisms of the withdrawal or recidivistic type.

The author holds that the usual treatment of behavior disorders in children is directed against the undesirable behavior, which is only a symptom of the maladjustment. The prevailing method among teachers and parents is to counter-attack the types of behavior, while indulging the behaviors of withdrawal and dependency. Since a child's behavior is naturally more active, more aggressive and experimental than the adult's behavior, the child cannot be considered a miniature adult in behavior any more than he is a miniature adult in mind and body. Social behavior is not transformed by knowledge or instruction until that knowledge becomes integrated into the behavior of the individual.

The author uses scientific technique in collecting his information. For instance, (page 28) this question was asked the teachers: "Does the child ever lie about what he has done or failed to do when he is expected to tell the truth?" The teacher is asked to check one of these four answers.

Has never occurred

Has occurred once or twice but no more

Recurs with occasional frequency

Has become almost habitual

The author concludes that we need a re-education in attitudes on the part of adults as to what constitutes a behavior problem. He maintains that the task of re-educating the adult is more difficult than re-training the child. He recommends: (1) that teachers be given a better knowledge of what constitutes normal behavior; (2) that they be trained to seek out the social and experiential backgrounds of children, as well as their physical and mental capacities; (3) that the teachers be instructed in methods of training behavior problems by directing the treatment to the underlying emotional and experiential factors that cause the behavior; (4) that experiments be tried in certain schools using visiting teachers, a psychiatrist, and a psychologist to help work out the problem.

"If education for life is to become a meaningful concept we shall need to investigate the social and emotional dynamics of behavior as well as the intel-

lectual development of the child." (page 188.)

J. FREEMAN GUY
Associate Superintendent of Schools
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THORNDIKE, EDWARD L., and GATES, ARTHUR I. *Elementary Principles of Education.* New York: MacMillan, 1929. x. + 335 pp.

In this brief treatise of the principles of education the authors "have endeavored, first, to select those general facts and principles which will be of most service to typical elementary and high-school teachers . . . Secondly, to present these facts and principles in a form intelligible to students who have had few or no other courses in education and little or no professional experience . . . Thirdly, to offer an account based, as far as possible, upon the findings of scientific study." Every teacher who has offered a course in the principles of education to undergraduates fully realizes that such a treatise in this field is needed.

After a brief discussion of the province of education the authors show that the ultimate aim of education is the fullest satisfaction of human wants, not the realization of individual desires but the wants of humanity as a whole. The major educational objectives usually enumerated by writers on educational theory are treated here as the major present needs of education and grouped under two headings, namely: (1) Needed Adjustments to Situations in Modern Life; and (2) Needed Types of Personal Equipment. A more comprehensive sociological background in justification of the first of these groups of objectives would have added to the clearness of the discussion for undergraduates and made it possible for them to see what makes educational aims valid and how they may differ from one generation to the next.

Very lucid chapters on The Original Nature of Man and The Main Characteristics of Learning provide an excellent background for the succeeding chapters on The Acquisition of Knowledge; The Ability to Think; and The Acquisition of Reactions. The discussion of Subjects and Activities gives the reader an excellent perspective of the real meaning of subject matter, method, and significance of each in the educative process. Age and maturity in relation to learning, the significance of individual differences in teaching, a good summary of teaching methods, and a chapter on appraising the results of education add to the value of the book.

In a critical reading of the book one is torn between two opinions. On the one hand one is impressed with the excellence of this summary of modern educational theory for the experienced teacher; on the other hand one wonders whether the book, even with the suggested reference readings, is usable for a class with little or no knowledge of concrete educational procedures, and whether the book, for undergraduates at least, should not come at the close of their study of educational theory rather than at the beginning. To the present reviewer, principles of education, if they are to be teaching controls should be the outgrowth of experience rather than the points of departure.

Miami University J. W. HECKERT

RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

GRANT, JOHN L. "The Single Standard in Grading," Reprinted from *Columbia Law Review*, XXIX, (November, 1929), 920-955.

The author reviews the present tendency to employ different standards, and the lack of justification for such a method of grading. Following this is a presentation of technique for a single standard of grading.

PIÉRON, HENRI. *L'Année Psychologique*. Paris: *Librairie Felix Alcan*, 1928, 2 vols.

These two volumes form an invaluable summary of the experimental literature of the year, paralleling, in a way, our own *Journal of Psychological Abstracts*. While the *Psychological Abstracts* appear monthly, *L'Année Psychologique* appears annually, presenting a summary of the materials appearing on general psychology, neurology, comparative psychology psychophysiology, sensation and perception, the affective processes, habit and memory, association and imagination, thinking and mental attitudes, language, work and its attending conditions, attention, personality, applied psychology (including applications to commerce, medicine, pedagogy, etc.), psychotechniques (including test construction), statistics, and metaphysical discussions of various sorts.

RYAN, W. CARSON, JR. "The Literature of American School and College Athletics." New York: *The Carnegie Foundation for the Advancement of Teaching*, 1929, 305 pp.

This bulletin contains a foreword by Henry S. Pritchett, President of the Carnegie Foundation, and a brief summary of tendencies, and findings from a survey of the literature of American school and college athletics. The greater part of the bulletin is given over to the presentation of an annotated bibliography dealing with the various aspects of American school and college athletics.

SHAW, WILFRED B. "Alumni and Adult Education: An Introductory Survey." New York: *American Association for Adult Education*, 1929. 117 pp.

This bulletin contains materials upon alumni and adult education, views of college presidents, alumni officials, and college graduates; also, typical adult programs, with evaluations.

EXPERIMENTAL STUDIES REPORTED IN CURRENT ISSUES OF OTHER MAGAZINES

EDUCATIONAL ADMINISTRATION AND SUPERVISION

CRAWFORD, ALBERT BEECHER. "Forecasting Freshman Achievement," *School and Society*, XXXI, (January 25, 1930), 125-132.

Reliable estimates of individual students' fitness for college work are impor-

tant. According to the author, the scholastic success of Yale freshmen is effectively predicted from a weighted combination of various pre-matriculation data. These predictions correlate about .70 with subsequent freshman year grades.

NELSON, M. J. "An Analysis of the Two-year Curricula Offered in Thirty Teacher-Training Institutions," *Educational Administration and Supervision*, XVI, (January, 1930), 59-62.

A serviceable analysis of the two-year curricula of 30 teacher-training institutions.

PSYCHOLOGY OF LEARNING

ABERNETHY, ETHEL M. "Photographic Records of Eye-Movements in Studying Spelling," *The Journal of Educational Psychology*, XX, (December, 1929), 695-701.

A comparison of the eye-movements of good spellers and poor spellers gives results analogous to the results of similar investigations of the reading process.

CLEM, ORLIE M., AND MALLOY, KATHIE V. "Some Individual Differences of Pupils in One Typical Junior High School," *Educational Administration and Supervision*, XVI, (January, 1930), 39-52.

This article contains an abundance of statistical and tabular material, bearing upon individual differences, which should be of value for comparative purposes.

CORBALLY, JOHN E. "A Comparison of Two Methods of Teaching One Problem in General Science," *The School Review*, XXXVIII, (January, 1930), 61-66.

A comparison of the assignment recitation plan of teaching general science with the Morrison unit plan. The author concludes that neither method of teaching is distinctly superior to the other, the teacher being the determining factor.

JOHNSON, PALMER O. "The Permanence of Learning in Elementary Botany," *The Journal of Educational Psychology*, XXI, (January, 1930), 37-47.

Those students who have the most botanical information at the time of completing the general botany course are likely to retain, not only absolutely, but relatively, more of this information after the lapse of three to six months of time. The study has certain implication values bearing upon the setting up of prerequisites for subsequent courses in university education.

SMITH, ELSIE WARDLEY. "Mental Confusion in Arithmetic," *The Forum of Education*, VII, (November, 1929), 211-226.

The author presents an analysis of the weakness of students in arithmetic tests, students' introspections about mental confusion in arithmetical work, the effects of different working conditions, mental confusion during ordinary class work, and mental stability. The research indicates that it is possible for a student to gain control over mental confusion to some extent, not so much by frontal attack, or by definite effort of will, as by avoiding the occasion of its arising.

WILLOUGHBY, RAYMOND R. "Incidental Learning," *The Journal of Educational Psychology*, XX, (December, 1929), 671-682, and XXI, (January, 1930), 12-23.

The subjects were 300 individuals ranging in age from 6 to 68. There is

a low but significant relationship between ability to recall associations formed incidentally and the amount of practice upon such associations. The article contains also a digest of six previously performed experiments in this field.

CURRICULUM RESEARCH

MILLER, ELEANOR OLMSTEAD. "A Study of the Preschool Child's Picture and Story Books by the Battery of Tests Method," *The Journal of Applied Psychology*, XIII, (December, 1929), 592-599.

The author presents a statistical technique and a score card for the selection of preschool children's picture and story books.

WRIGHT, JEAN CHARLES AND EARHART, WILL. "The Vocational Value of Music to High-School Pupils," *Curriculum Study and Educational Research Bulletin*, The Pittsburgh Public Schools, IV, (November-December, 1929), 96-120.

The purpose of this study is to ascertain the vocational value of music to high-school pupils. The study is based upon replies from 16,260 junior and senior high-school pupils of Pittsburgh. Six percent of all of the pupils in the Pittsburgh high schools earn money by means of music. Nearly half of the pupils play a musical instrument; and music, in one form or another, has a place in the lives of approximately five-sixths of the pupils.

EDUCATIONAL TESTS AND MEASUREMENTS

EELLS, WALTER CROSBY. "Reliability of Repeated Grading of Essay Type Examinations," *The Journal of Educational Psychology*, XXI, (January, 1930), 48-52.

The wide variability of different teachers in grading the same examinations of the essay type is well known. The object of this paper is to study the reliability of repeated gradings of the same examination. The author concludes that regrading of the same examination by the same teachers after an interval of eleven weeks is very unreliable, the coefficients of reliability varying from 0.25 to 0.51.

GORHAM, DONALD R., AND BROTEMARKLE, R. A. "Challenging Three Standardized Emotional Tests for Validity and Employability," *The Journal of Applied Psychology*, XIII, (December, 1929), 554-588.

A comparison of the Downey Will-Temperament Test, the Pressey Cross-Out Tests, and the Brotemarkle Comparison Tests. The authors conclude that while the statistical method does not support the validity of these tests, case studies indicate that they are valuable in the hands of experienced clinicians.

HOLZINGER, KARL J. "The Probable Error of a Difference Formula," *The Journal of Educational Psychology*, XXI, (January, 1930), 63-64.

An article pointing out an error in previously developed formula for the probable error of a difference.

OATES, DAVID W. "The Relation of Temperament and Intelligence to Scholastic Ability," *The Forum of Education*, VII, (November, 1929), 171-185.

The correlation between intelligence and temperament traits is low; the correlation between temperament traits and scholastic ability fairly high. From these data the author concludes that cer-

tain factors other than intelligence are present in scholastic achievement.

WORLTON, J. T. "The Sigma Index Score as a Standard Measuring Unit," *The Elementary School Journal*, XXX, (January, 1930), 354-362.

This article describes briefly the sigma index score as a standard measuring unit. The Sigma index score is a modification of the standard score, and, according to the author, has certain advantages in the evaluation of the measurable outcomes of instruction.

NEW TESTS

BURTON, WILLIAM H., AND BURTON, VIRGINIA N. "Burton Civics Test." Chicago: World Book Company.

The test consists of sixty questions of the alternate answer type, and is designed for grades five to nine. The curricular validation is adequate; the validity and reliability of the test is high. The norms are based upon the testing of about 8,000 pupils.

KINNEY, LUCIEN B. "Kinney Commercial Arithmetic Tests," published by Public School Publishing Company, Bloomington, Illinois, 1929.

There are three tests, Tests A, B, and C. Tests A and B are designed for use at the end of the first semester, and Test C for use at the end of the second semester. The tests include diagnostic and remedial features.

LANE, RUTH O., AND GREENE, H. A. "Lane-Greene Unit-Achievement Tests in Plane Geometry," published by Ginn and Company, Boston, 1929.

There are six tests of two forms each, as follows:

Test 1. Fundamental Ideas of Geometry. Form A.
Test 1. Fundamental Ideas of Geometry. Form B.
Test 2. Parallel Lines and Triangles. Form A.
Test 2. Parallel Lines and Triangles. Form B.
Test 3. Rectilinear Figures. Form A.
Test 3. Rectilinear Figures. Form B.
Test 4. The Circle. Form A.
Test 4. The Circle. Form B.
Test 5. Proportion and Similar Polygons. Form A.
Test 5. Proportion and Similar Polygons. Form B.
Test 6. Areas of Polygons. Form A.
Test 6. Areas of Polygons. Form B.

MORGAN, M. E., WAIT, W. T., AND DVORAK, AUGUST. "Seattle Solid Geometry Tests," published by Public School Publishing Company, Bloomington, Illinois, 1929.

This series of tests is made up of nine sub-tests to be given during the semester for teaching purposes, and two scales entitled Scale A, Final Examination, and Scale B, Preliminary Examination.

NASH, HARRY B., AND VAN DUZEE, ROY R. "Nash-Van Duzee Industrial-Arts Tests for Mechanical Drawing," published by Bruce Publishing Company, Milwaukee, Wisconsin, 1930.

There are two forms of the test, a manual of directions concerning the purpose and validation of the test, and, also, data pertaining to norms, etc.

The Jersey City Handwriting Scales for Grades 2A to 6B. Jersey City: Board of Education, 1929.

There is a scale for each half grade, with three levels of quality, namely, minimum, standard, and superior.

WEST, PAUL V. "The American Handwriting Scale." New York: A. N. Palmer Company, 1929.

This scale contains seven levels of quality on one sheet, one for each grade from two through eight. There is a manual describing the development of the scale and the uses to which it can be put.

MISCELLANEOUS

HASKELL, MARION E., AND HUDELSON, EARL. "What Test Should I Use?" *School Science and Mathematics*, XXIX, (November, 1929), 841-849.

The authors emphasize the fact that tests need to be selected according to the specific uses to which they are to be put. An analysis of a unit in health work listing the knowledges, skills, and dispositions desired, is presented with a comparison of its content with the content of 9 well-known tests selected from the field of general science and biology. The results indicate that many aspects of the subject are wholly neglected.

HECK, ARCH O., AND REEDER, WARD G. "The Uniform School Accounting System," published by Public School Publishing Company, Bloomington, Illinois, 1929.

A carefully devised accounting system based upon a careful study of the opinions of experts in this field, the advice of practical school people, and an analysis of other recently published accounting systems. The forms are simple and adequate.

PALMER, ARCHIE M. "Fifty-Five New College Presidents" *Association of American Colleges Bulletin*, XV, (November, 1929), 12 pp.

The author lists the several new presidents with data concerning their previous experience, training, and considerations and motives leading them to administrative work.

STEDMAN, MELISSA BRANSON. "A Study of the Possibility of Prognosis of School Success in Typewriting," *The Journal of Applied Psychology*, XIII, (October, 1929), 505-515.

The Thurstone Employment Tests, the Terman Group Test of Mental Ability, the MacQuarrie Test of Mechanical Ability, and tests of arithmetic and spelling, as well as a physical examination, were used to predict success in typewriting for 75 tenth-grade students enrolled in typing in the Bell High School, Los Angeles, California. Insofar as vocational guidance is concerned, no test was found to correlate highly enough with typing to make it possible to tell a child whether or not it would be worthwhile for him to take up typing as a vocation.

WILSON, W. K. "A Device for Computing Critical Ratios," *Educational Research Bulletin*, Ohio State University, VIII, (November 20, 1929), 383-385.

A device for computing critical ratios by means of a slide rule.

WILSON, W. K., AND ASHBAUGH, E. J. "Achievement in Rural and Consolidated Schools," *Educational Research Bulletin*, Ohio State University, VIII, (November 6, 1929), 358-363.

A comparison of the achievements in arithmetic and reading in rural and consolidated schools for 778 pupils and 36 groups. In 33 of the 36 groups the mean achievement scores favored the consolidated schools. While the differences are slight in certain instances, they consistently favor the consolidated school.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor V. T. Thayer, Ethical Culture Schools, 33 Central Park West, New York City.

A report dealing with the question of the overloading of the curricula in the French schools submitted recently to the Paris Academy of Medicine charged that excessive hours of study and training subjects are impairing the health of school children. We gather, however, from the printed report that this conclusion rests more upon individual opinion than upon objective data. Thus Madame Curie affirms that a program of study in the *Lycée* which requires a child to attend school from eight o'clock in the morning until four o'clock in the afternoon followed by study before and after dinner is evidence of overstudy. On the other hand, Dr. Vaillard, who is "médicin inspecteur général," believes that since statistics give no evidence of an increase in morbidity of school children in recent years, there is no evidence of overloading.

Another scientist who is professor at the Sorbonne and an examiner for the Bachelor's Degree, affirms that the title of Bachelor's Degree has no value and that three-fourths of the subjects of which a knowledge is required might easily be omitted. These statements taken together with the fact that a committee to study the question of overloading in the French schools has both been enlarged and directed to make a further report, indicates that the curricula of the French secondary schools are probably to undergo thorough study. It is interesting to note that this study is now being approached from the standpoint of the health and welfare of the child as a whole rather than merely from the standpoint of his intellectual accomplishments. Students of the curriculum in the American secondary schools will be interested in the outcome of these investigations.

Dr. Frank M. Phillips, chief of the division of statistics in the Office of Education, has made public certain conclusions regarding the supply of teachers based upon statistics compiled on teachers' colleges and normal schools in 1927-28. He investigated for statistical use 339 American institutions which are engaged primarily in the preparation of teachers for positions in elementary and high schools. These schools are classified as teachers' colleges, state normal schools, city normal schools, county normal schools, and private normal schools. He finds that the number of teachers' colleges has increased from 101 in 1926 to 137 in 1928. State normal schools have been reduced from 102 to 69 in number. County normal schools have dropped from 108 in 1926 to 46 at present.

In 1920 the teachers' colleges trained 40.4 percent of all students in strictly teacher-training institutions; in 1928 they were training 75.4 percent. The public teachers' colleges and normal schools enroll 93 percent of all students taking teacher-training work.

Dr. Phillips finds that the increase from year to year, so noticeable in the period 1918 to 1924, in the number taking teacher-training work seems to be tapering off. In 1918, 115,653 students were in teacher-training; in 1920, 135,435; in 1922, 194,534; and in 1924, 245,669. In 1926, there were 270,206 students taking teacher-training as compared with 274,348 in 1928. These figures, however, do not include students enrolled in teacher-training courses in high school, in colleges, and in universities. Nevertheless, Dr. Phillips finds that with all the institutions included, there are 512,247 students who are taking teacher-training as compared with some 900,000 teaching positions, or four prospective teachers for every seven positions.

The results of two surveys conducted by the Office of Education have recently been published. At the request of the School Board of Roanoke, Virginia, and with the approval of the State Superintendent of Public Instruction of Virginia, the Office of Education conducted a survey of the junior and senior high schools in Roanoke. This survey was in charge of W. S. Deffenbaugh and Carl A. Jessen of the Office of Education. The report of this survey was published in September by the school authorities of Roanoke. Similarly, at the request of the Board of Education of Mt. Vernon, N. Y., a school building survey of that city was conducted in January and February of 1929 under the auspices of the United States Office of Education. Miss Alice Barrows, specialist in school buildings to the Office of Education, directed the survey. The printed report of this survey has just been published by the Board of Education of Mt. Vernon with a foreword by the United States Commissioner of Education, William John Cooper. The report of the survey of Mt. Vernon will be of particular interest to cities in the immediate vicinity of large metropolitan areas since it shows some of the problems in social and educational engineering created by the inundation of population from expanding metropolitan areas.

One significant use of educational surveys is mentioned in a statement recently issued by the United States Department of the Interior. This department reports that approximately 1,200 acts of educational legislation with general application were passed in the United States during the years 1926-1928, and that there is an increased tendency to employ surveys and state-wide investigations as a basis for legislation.

This statement adds further regarding trends in educational legislation:

Within these two years more states than usual took legislative action toward revising and codifying their school laws relating to education; and the trend of present legislation is toward fixing greater responsibility in the State boards for the administration of the State school systems.

Financing public education now constitutes the foremost problem in educational legislation. Within the past decade practically every state has in some way endeavored to equalize educational opportunities by increasing State aid for poor communities.

As compared with other governmental or civil units, the county entered the business of administering public education somewhat late. In general, the community unit, township or district, was the first in the field, but since the beginning of the present century the county has rapidly attained an important place in public education. There is a decided trend toward placing greater responsibil-

ity upon the county as a unit in educational affairs. The enhanced importance of the county is the result of the assumption of responsibilities formerly exercised by the district rather than those exercised by the State.

The tendency to raise the qualifications required of county superintendents appeared in a few states. Recent legislation also increased the salaries of county superintendents in Arkansas, Colorado, Illinois, Indiana, Iowa, Mississippi, Missouri, and New Jersey—marked increases were made in Illinois and Mississippi.

Recent enactments show a tendency to provide for larger school units in rural communities by the abandonment of small schools, especially one-teacher schools, and by transportation of pupils of such schools to larger school buildings. Legislative provisions encouraging consolidation and transportation during the past two years were enacted in more than half the states.

In recent years the legislatures in the majority of states have manifested a laudable effort to provide means for all children to receive secondary instruction. The effort has been not so much in the way to establishing more high schools, but rather in providing means whereby pupils may attend such schools already established.

Within the two years legislative measures providing for junior colleges were enacted for the first time in 11 states.

NOTICE ON MENTAL HYGIENE CONFERENCE

On Monday, May 5th, 1930, at Washington, D. C., the First International Congress on Mental Hygiene will convene. Sessions will continue until noon on May 10th. This Congress will symbolize the extraordinary developments in mental hygiene throughout the world; it will summarize the achievements of twenty years and will lay the plans for future work.

Psychiatrists, general medical practitioners, psychologists, educators, social workers, students of industry, health officials, and others interested in the treatment of mental disorders and the conservation of mental health will come from every part of the world. Mr. Herbert Hoover is the Honorary President of the Congress.

Among the topics to be discussed will be the following:

Magnitude of mental hygiene as a health problem.

Organization of community facilities for prevention, care and treatment.

Mental Hospitals and their role in community life.

Treatment of mental patients outside of institutions.

Special types of clinical service, such as those in courts, schools, communities, hospitals, and social welfare organizations.

Scope and function of psychiatric social work.

Mental hygiene aspects of delinquency, dependency, and other types of social maladjustment.

The School—educational aspects of mental hygiene.

Parent-child and teacher-child relationships in character and personality development.

The adolescent—his special problems.

Mental hygiene in industry, personnel work and vocational guidance.

Types of personnel required in mental hygiene work (physician, psychologist, nurse, social worker, and occupational therapist).

Social aspects of mental deficiency. The preschool child-role of mental hygiene in starting him right.

Children of special types: (1) the child with superior intelligence; (2) the neurotic child; (3) the child with sensory and motor defects.

Training physicians in mental hygiene.

The future of human relationships in the light of the possibilities of mental hygiene.

One of the outstanding features of the Congress will be the effort to formulate a series of "objectives" as constituting the most important goals in mental hygiene. A survey of mental hygiene progress is now being made in the various countries to serve as a factual basis for making this formulation.

Another purpose of the Congress will be to achieve some form of permanent international organization for the mental hygiene movement. The "Organizing Committee of the International Committee for Mental Hygiene," with representatives from many countries, will submit a plan of organization to the Congress.

The President of the Congress is Dr. William A. White, Superintendent of St. Elizabeth's Hospital, Washington, D. C.; the Secretary-General is Clifford W. Beers, founder of the mental hygiene movement; the chairman of the Committee on Program is Dr. Frankwood E. Williams, Medical Director of The (U.S.) National Committee for Mental Hygiene; and the Treasurer is Thomas W. Lamont. Speakers will be drawn from the ranks of mental hygienists throughout the world.

At the same time and place as the International Congress will be held are the annual meetings of the *American Psychiatric Association* and the *American Association for the Study of the Feebleminded.*

The Commission on Direction of the Investigation of History and other Social Studies in the Schools, sponsored by the American Historical Association, discussed and approved at a meeting in New York City, November 7-8, the testing program to be carried out under the direction of Truman L. Kelley. The proposed plan had previously been considered by the Advisory Committee on Tests.

The members of the Commission are: Frank W. Ballou, Superintendent of Schools, Washington, D. C.; Charles A. Beard, New Milford, Ct.; Isaiah Bowman, American Geographical Society; Ada Comstock, Radcliffe College; George S. Counts, Teachers College, Columbia University; Guy Stanton Ford, University of Minnesota; Evarts B. Greene, Columbia University; Ernest Horn, University of Iowa; Henry Johnson, Teachers College, Columbia University; W. E. Lingelbach, University of Pennsylvania; Leon C. Marshall, Johns Hopkins University; Charles E. Merriam, University of Chicago; Jesse H. Newlon, Director, Lincoln School, New York City; Jesse F. Steiner, Tulane University, and A. C. Krey *Chairman*, University of Minnesota.

The personnel of the different advisory committees thus far appointed and at work includes:

Advisory Committee on Objectives: Charles A. Beard; Boyd H. Bode, Ohio State University; Guy Stanton Ford; Charles E. Merriam; Harold Rugg, Teachers College, Columbia University; and A. C. Krey.

Advisory Committee on Tests: Frank W. Ballou; Isaiah Bowman; Howard C. Hill, University of Chicago; Ernest Horn; Ben Wood, Columbia University; and A. C. Krey, Chairman.

Advisory Committee on Public Relations: Frank W. Ballou; Ada Comstock; John A. Fairlie, University of Illinois;

A. C. Krey; Robert S. Lynd, Social Science Research Council, New York City; and Jesse H. Newlon, Chairman.

School administrators, teachers of the social studies, and other interested groups have been generous in assistance given to the staff of the investigation. Communications from individuals who are interested in current activities of the investigation should be sent to 316 Library, University of Minnesota, or 610 Fayerweather Hall, Columbia University, New York City.

The pupil population of secondary schools continues to increase rapidly. Thus Carl H. Jessen of the Office of Education reports in Bulletin, 1929, No. 22 on *Secondary Education* that while the total population of the United States in 1918 to 1926 increased about 14 percent the number of pupils in secondary schools came within one hundred thousand of doubling during the eight-year period. The number of high schools increased 5,400 or 33 percent and the teaching force practically doubled in this same period. He adds, "At the present time, more than one-half of our population of ages 15-18 inclusive is actually enrolled in secondary schools. In 1918, the percentage was 28.29; 1920, 37.80; in 1922, 41.74; in 1924, 48.35; and in 1926, 53.12. The corresponding percentages for enrollments in public high schools range from 25.6 in 1918 to 48.2 in 1926."

Similarly, this study shows that the administrative reorganization of the secondary school continues apace. "In 1924, 2,549 high schools exclusive of junior high colleges, reported that they had deviated from the regular four-year organization. In 1926, the Bureau of Education had a record of 3,637 reorganized schools, a 42 percent increase during two years." The states in which the largest number of schools have been reorganized are, in order, Ohio, Indiana, Michigan, with Pennsylvania and Massachusetts tied for fourth place. The states in which the ratio of reorganized to the total number of high schools is highest, are, in order, Alabama, Massachusetts, Vermont, Utah, New Hampshire, Michigan, Colorado, West Virginia, Arizona, Florida, Wyoming, and California. In all of these states more than one-third of the schools have been reorganized.

The Bureau of Child Welfare has recently published a list of psychiatric clinics for children. This list indicates that in 1928 there were nearly 500 clinics in approximately 350 cities and 36 states. Miss Grace Abbott, chief of the bureau states that—

"Until recently there was no agency in the community which could give intelligent consideration to a child's problems from all points of view—physical, mental, educational and social. Yet, as we know, all these phases of life act and react, one upon another. Scientific study of the physical, mental and social make-up of children began with delinquent children, just as our knowledge of child health is the outgrowth of study and treatment of sick children. It was only twenty years ago that the first clinic for the study of delinquent children was set up, in connection with the Chicago Juvenile Court. To-day nearly 500 child guidance clinics or habit clinics for young children are in existence in the United States. Their number, however, is still insufficient to meet more than a small fraction of the need which exists for scientific study of children's problems, not only those involving delinquency, but also such problems as serious school failure or great repression and intimidation."

The Office of Education has issued two valuable bulletins dealing with rural education. These are Bulletin, 1929, No. 18 on *Rural Education in 1926-1928* and Bulletin, 1929, No. 20, entitled *Certain Phases of Rural School Supervision*. The latter document consists of abstracts of addresses delivered at the third conference of supervisors of the southern states, held at New Orleans in December 1927. These papers deal with questions such as the education of mentally deficient and crippled children, problems of supervision and the organization of supervision, improvement of teaching, etc.

Bulletin No. 18, prepared by Katherine M. Cook, constitutes an excellent survey of the present status of rural education in the United States. The report indicates that there is a distinct trend in the direction of centralization through "The assumption of increased responsibility of the State unit for the support of local school systems, the correlative and often parallel practice of setting up increasingly higher standards which all schools, or those participating in the distribution of State funds, are expected to meet, and the rapidly growing movement to establish or increase State equalization funds."

The report records material progress in supervision. Thus in 1916 there were 46 state rural-school supervisors in contrast with the present time in which there are 172 state department staff members assigned to rural education in 38 states.

Increased attendance in rural schools seems to go hand in hand with the trend toward consolidation of schools, improved supervision, and the improvement of teaching. Thus the report reads:

"Recent statistics show that enrollments in rural high schools have increased 26.5 percent over a two-year period. This percentage increase approaches equality with that in high-school enrollment for cities. In view of the continued migration to the cities and of large numbers of rural children transported to and enumerated in the city high schools, the increase is encouraging. It may be safely estimated that at the present time 1,150,000 boys and girls are enrolled in high schools in population centers of fewer than 2,500, about 25 percent of the rural youth 15 to 18 years of age. More than 70 percent of similar age groups in urban areas are enrolled in high schools. Statistics of the type cited indicate that the future development of high-school education, particularly that concerned with universalizing secondary-school opportunities should take place chiefly in the country."

Secretary of the Interior, Roy Lyman Wilbur, has recently appointed an advisory committee on illiteracy consisting of about twenty-three members. This committee will assemble facts on illiteracy in the United States. When the facts are known it is expected that the committee will suggest remedies and methods designed to cope more effectually with the situation.

Two mimeographed bulletins from the Department of Research and Auxiliary agencies of the Oakland Public Schools give a mass of interesting data concerning the grades given in the junior and senior high schools. The municipal system of grading is used, 1 being high and 5 low. One would expect in a normal distribution that the percentage of 1's and 2's would be only slightly greater than the 4's and 5's. Actually, in the senior high schools, the percent of 1's and 2's is 60.5 and of 4's and 5's is only 5.9. In the junior high schools the percents are 65.0 and 2.8 respectively. The bulletins would be of greater immediate

value and of wider general interest if the data presented had been carefully and fully discussed.

The special survey bulletin of the Department of Educational Research and Service of the San Francisco Public Schools contains a very interesting study of the Commodore Stockton School. This school is located in the heart of San Francisco's Chinatown and is attended by some 1,100 Chinese children. Eighty percent of these children were born in California, the greater number in San Francisco. More than half of the parents were born in China. All the children speak Chinese as well as English, and a very high percent 97.7 read Chinese. As one might expect, the American norms in intelligence tests and reading are higher than the norms attained by the Chinese children on these tests. The language handicap is undoubtedly a large factor in accounting for this lack of attainment. This brief survey should prove to be the beginning of a series of studies of very great interest to students of education.

On the 26th of last December, an Educational Research Association of New York State was organized in Syracuse. This has been under discussion a year. A committee was appointed a year ago to plan a research program for this holiday time and also to draw up tentative plans for organization. The program proved a success, and a permanent organization was launched at a business meeting following the program. The following were elected officers:

President—Warren W. Coxe, Director of Educational Research, New York State Education Department.

Vice President—Harry P. Smith, Director of Research, Syracuse Public Schools and Professor of Education, Syracuse University.

Secretary-Treasurer—Arthur L. Maxon, Director of Research, Department of Public Instruction, Schenectady, N. Y.

Directors—J. E. Butterworth, Professor of Education, Cornell University, and Worth McClure, Professor of Education, University of Buffalo.

A study of state school taxes and state school funds and their apportionment, recently completed by Professor Fletcher Harper Swift of the School of Education of the University of California and Mr. Bruce Lewis Zimmerman, Research Assistant in Education, has just been published by the United States Bureau of Education as Bulletin 1928, No. 29. This bulletin, divided into 48 chapters, answers two major questions for each state: (1) what types of state taxes are levied for public schools; (2) what state school funds are provided and how are they apportioned.

THE TENTH ANNUAL OHIO STATE EDUCATIONAL CONFERENCE

"Reaching the Individual" will be the keynote of the Tenth Annual Ohio State Educational Conference to be held in Columbus, April 3, 4, 5, 1930. Mr. Robert M. Hutchins, president of the University of Chicago, will speak at the Thursday night general session. Mr. E. H. Sothern, well-known actor and dramatic reader, will give a series of readings from Shakespeare Friday night. One additional speaker for the Thursday night general session is yet to be secured.

More than one-hundred speakers, including some thirty-five from out of the state, will participate in this conference in which a registration of over five thousand is expected. Last year 5,100 were registered.

Visual education will be a new topic for which sectional meetings will be held.

One or more meetings will be held by groups interested in each of the following fields of education: adult education, attendance supervisors, school nurses and visiting teachers, biological science, city superintendents, clinical psychology, commercial education, county superintendents, educational and intelligence tests, elementary principals, elementary teachers, English, geography, higher education, high-school principals, home economics, industrial and vocational education, journalism, junior high-school principals, kindergarten and primary teachers, Latin, mathematics, modern languages, music, non-biological science, parent-teacher association, physical education, religious education, school business officials, school librarians, special education, teacher training, village and consolidated school superintendents, and visual education.

CONFERENCE ON VOCATIONAL GUIDANCE

The annual conference of the National Vocational Guidance Association will be held in Atlantic City on February 20th, 21st, and 22nd. The headquarters of the conference will be the Hotel Chalfonte. The conference will open with an address by Dr. A. J. Stoddard, Superintendent of Schools at Providence, R. I., on "The Role of Guidance in Public Education." A new feature will be a luncheon meeting devoted to publicity for vocational guidance, at which Dr. Harry D. Kitson of Teachers College will preside. Dr. Rolf Reynolds, of Columbia, will lead the discussion. Dr. Arthur J. Jones, University of Pennsylvania, will preside at another luncheon meeting when Dr. Houseman of Switzerland will discuss "Guidance Activities in Europe." The conference will devote special sessions to such topics as: Organization and Development of a Vocational Guidance Department; Placement Problems in Guidance; Guidance Outside of the School; Objective Methods in the Personal Interview in Guidance; Measurement of Interest and of Vocational Traits; Validation of Guidance Procedures; and Guidance of the Mentally Defective. There will also be a joint meeting of the Personnel Research Federation and the National Vocational Guidance Association.

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